PITMAN'S

HANDWORK SERIES

A GUIDE TO SCHOOL HANDICRAFTS

HERBERT TURNER

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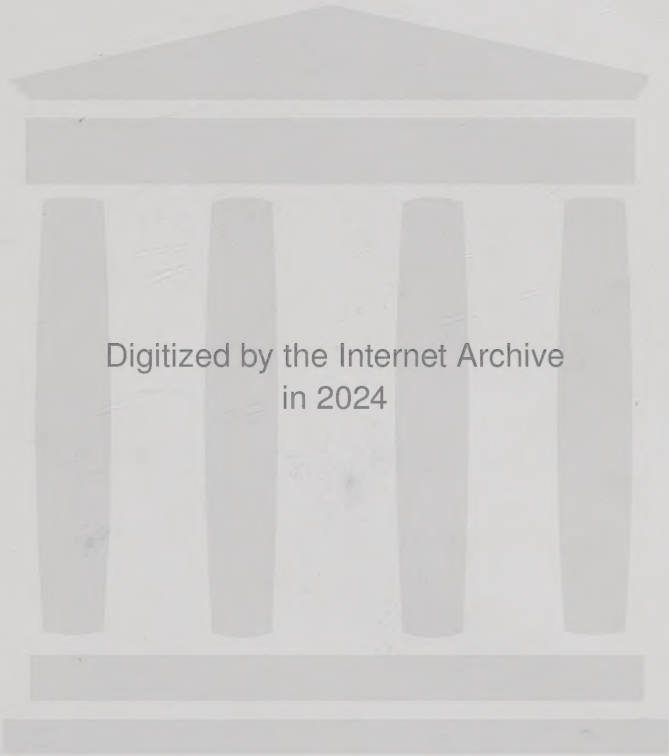
A complete list of books in this series, with full descriptions and specimen pages, is given at the end of this volume.



War Memorial in Oak.

Inlaid with Ebony and Sycamore.

Designed, Carved, and Inlaid by the Author. *Frontispiece*

PITMAN'S HANDWORK SERIES

A GUIDE TO SCHOOL HANDICRAFTS

BY

HERBERT TURNER

DISTRICT ORGANIZER OF HANDWORK UNDER THE LEICESTERSHIRE COUNTY COUNCIL

LECTURER ON HANDWORK SUBJECTS FOR THE EDUCATIONAL HANDWORK ASSOCIATION

LONDON

SIR ISAAC PITMAN & SONS, LTD.

PARKER STREET, KINGSWAY, W.C.2

BATH, MELBOURNE, TORONTO, NEW YORK

1922

Printed by
Sir Isaac Pitman & Sons, Ltd.
Bath, England

PREFACE

The reasons for the writing of this book will be found in detail in Chapter I ; more briefly they are—the widening of the field of Practical Instruction brought about by the Education Act of 1918, and more particularly defined by the Circular No. 1,161 issued by the Board of Education in May, 1920.

This widening of the field of Practical Instruction had already been attempted sporadically, and often successfully, by enthusiasts and dreamers of dreams ; but now that official sanction has been given, we may see that extension become not only wide, but wild. Herein lies a great danger, and we must all do what we can to guide the new spirit into stable and reasonable forms that will "endure to the end" with the strength that ensures permanence.

One very sure principle is this : that all objects of craft work that we make should arise out of a real *need*. It is the Need that is the Model. If we apply this principle to every object we attempt, we shall find it to be an invariably safe sheet anchor which will make drifting an utter impossibility.

My thanks are due to Mrs. Sargent for her very expert assistance with the chapter on Embroidery ; to Miss F. Cottingham for similar help with Indian Basketry ; and to Mr. Stewart Taylor for his kindly encouragement.

HERBERT TURNER.

Leicester, 1922.

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A GUIDE TO SCHOOL HANDICRAFTS

CHAPTER I.

THE PURPOSE OF THE BOOK.

"Rather to open up a way, whereby the imprisoned splendour may escape. . . ."
BROWNING.

"And thus at the roaring Loom of Time I ply,
And weave for God a garment thou see'st Him by."
GOETHE.

THESE quotations indicate the purpose of this book. Man is yet largely bound down by the inhibiting factors of tradition, custom, form, economics, and ignorance, and is prevented from exercising those qualities which he knows, however dimly, he possesses; and, more than that, he is prevented from bringing to "the threshold of consciousness" those still more numerous and greater qualities which are lying latent, and which he is not yet conscious that he does possess.

It has been well said that: "Man is not yet born; he is still in the womb of Time."

Emerson says: "All wisdom resides in the soul; knowledge is but recollection."

All that we ever can, and ever shall be, lies already in us. What we are is what has been unrolled, and what we shall be is still lying latent, but with a potentiality that can at any time become active. This dormant power is slowly awakening under the impact of experience, and in each individual is uneasily stirring along different lines into life.

Education is, in its broadest aspect, the awakening of the self; and to this great end provision must be made for affording contact of the self with all experience, so that this awakening can be accomplished surely and thoroughly.

That aspect of education which is known as Practical Instruction is of very great value in awakening these dormant qualities of soul at a certain definite stage in the individual's career, and so bringing it to life in the fullest meaning of the term, viz., that of the closest internal correspondence with the most extended external circumstances. What we as teachers, guides, friends—yes, and philosophers, too—have to do is to provide man, and especially children (with whose growth we are the more particularly concerned), with opportunities, sufficient and wide, that will enable the young, eager,

child spirit to manifest itself in all the fullness of its budding powers, so that those powers it knows it possesses, and that are partially aroused, will grow to their greatest possible extent; and those powers that lie below the "threshold of consciousness," and are yet unknown to their possessor, will be aroused from their age-long sleep and come into active manifestation.

So will man be born in the fullness of time; and by so opening up ways, will the imprisoned splendour escape from the bonds that now hold it fast.

General Education and Children's Interests.

General education is very largely a process of arousing potential intelligence, and of then developing it.

Children have many interests along the lines of which, if they can be given the opportunity of pursuing them, their intelligence will grow easily, naturally, and with the utmost vigour.

Speaking generally, these interests are greater along the lines of Practical Education, although this is not invariably so; and it is the object of this book to indicate many forms of Practical Instruction that children may follow, above and beyond the recognized wood work and metal work and cardboard work, in the School Class Room as well as in the Handicraft Room.

Girls and Practical Instruction.

Very limited opportunities have hitherto been given to girls in respect of Practical Instruction. There is no real reason for such restriction, and in many cases it is being removed; but, as yet, girls have no systematic or organic form of Practical Instruction on any great scale.

The Education Act of 1918.

The need for the extension of Practical Instruction has been recognized by the Board of Education, and in the Education Act of 1918 Handwork is made an integral part of education.

This undoubtedly throws upon Education Authorities, and upon teachers, a responsibility not immediately easy to discharge, and it must be for some years a matter of experiment and failure before we can arrive at a more or less stable system of School Craft.

This book can be looked upon as a serious contribution to Practical Instruction along the lines of the Art Crafts.

It can be said that all the crafts mentioned have actually been put into operation by the author, or under his supervision, and have all achieved a measure of success; some of them markedly so.

Circular 1,161, Board of Education.

This Circular, issued by the Board of Education in May, 1920, outlines broadly the possible forms of Practical Instruction that

may reasonably be employed. Every teacher should possess a copy of this Circular. A few extracts will indicate the character of the work suggested, and the Board's attitude towards Practical Instruction.

The Board . . . hope that . . . Authorities will appreciate the importance of widening . . . the character of the practical instruction given in elementary schools.

It is the hope of the Board that the practical instruction of older scholars will now become a more important part than hitherto of the ordinary work of the school. Its scope should become wider, and it may well include . . . various types of handicraft which have hitherto been attempted in a few individual schools, ...

At this age (11 12) the interest of the girls is easily roused in practical work.

It is often found that practical work appeals to, and stimulates the intelligence of, dull and backward girls more than the literary subjects of the curriculum.

The whole question is still to a large extent in the experimental stage, and the Board desire to leave as much freedom as possible.

It may not be unreasonable to devote as much as four or five sessions a week to a grouped course of practical subjects.

But the Board hope that in many schools . . . in addition to what may be called the basal course of Handwork, all older scholars, both boys and girls, will receive instruction in one or more of the following, choice being made as local circumstances suggest—

(*a*) Gardening; (*b*) Practical Science; (*c*) Some subsidiary form of Handwork, e.g. bookbinding, basket making, weaving, netting, knotting and splicing, cobbling, printing, various forms of art crafts—such as pottery, repoussé, carving—handyman's courses for boys, and home handicraft for girls.

Widening the Field of Craft Work.

Children are all in different stages of mental and spiritual development, and this causes them to have many and varied interests. By widening the field of craft work, these varied interests will have a greater possibility of satisfaction, and the pupil who needs work more in advance of others is not obliged to mark time, while the less evolved child will still find work suitable to his or her needs.

Making a Beginning.

It is not possible to give in this book exhaustive tuition in all the forms of craft work described in these pages; and, in fact, large numbers of students do not require such an exhaustive treatise, which often enough deals with matters and processes they do not need. It is enough that the main features of the craft are outlined.

It will be found that the most difficult task anyone has to face is to make a beginning. Once that problem is successfully solved, and given the right spirit and the necessary will, the way to the thorough mastery of a craft will be opened up.

It is hoped that this book will be of great value in helping to

extend the craft work done, not only in the ordinary day school but also in evening and continuation schools, and in giving suggestions and instructions in work that might not otherwise be introduced. Even where any of the crafts mentioned are being practised, it is hoped that a new view-point will be obtained from which the craft will be seen at a new angle.

It is to be hoped that one feature of recent years will become permanent. This is the greater leisure time we should have as the result of shorter hours of compulsory work ; the limitations of child labour ; and the raising of the school age by the Education Act of 1918.

This greater leisure is always a serious problem for those people whose present interests are not sufficient to enable them to fill their spare time with pursuits that give pleasure and joy.

It is hoped that this book will enable many to commence what will grow to be a fascinating source of pleasure.

The object of this book is to give sufficient detailed instruction and description that will enable any one (child or adult) to *commence* any one of the specified crafts ; and then, having commenced it, to point out the further road and the means wh reby further progress can follow.

To help in this, each chapter is built up on the same skeleton plan, and this plan is as follows—

1. *Description of the Work.* The varieties of each kind of craft work suitable for schools.

2. *Tools.* A specification and description of the minimum number of tools and other apparatus needed.

3. *Materials.* A specification and description of the necessary materials needed.

4. *Description of Tool Processes.* The actual working of one or more particular examples of each craft.

5. *The Further Road.* The steps to be taken to continue what has here been begun.

6. *Bibliography.* Books that will help in the further study and practice of each craft.

7. *The Probable Cost.* (*a*) The capital cost ; (*b*) the annual cost. It will be understood that the capital and annual costs refer to each craft as if each were the only one used in school. But if more than one be used, then it is probable that the same tools will do for two or more crafts. For example, if cardboard modelling is carried on in the school, then the knives used in that craft will do for stencilling, and the cost will be correspondingly reduced. Similarly, cardboard tools can be used for bookbinding ; the tools used in repoussé are the same as are used for embossed leather work ; carving tools are useful in wood block making, and for relief poker work. This should be taken into account in estimating costs of schemes.

CHAPTER II.

METHODS OF APPLYING AND TEACHING ART CRAFT WORK.

The Commencement.

ORNAMENT in all craft work depends upon construction. This makes its introduction gradual, and it can be applied in small quantities; and it makes also its introduction come at just the right time.

In selecting the children who are ready to begin the work of applying ornament, we must await that moment when a child becomes conscious of the need for ornament, and of his desire to apply it.

Not all children readily achieve success in art craft work. A process of natural selection must take place.

Then with freedom of choice given, and natural selection operating, we can find out who are likely to profit by doing this higher type of work.

It is astonishing how some children have a feeling for art craft work, and will have their attention held and their interest thoroughly aroused by it. We are all in varying stages of evolution, and, whilst it is true that many "grown ups" are not yet awake to higher forms of craft work, yet it is also true that many children are, and are quite alive to its possibilities.

An introduction can be effected with one child, or with a small group of children. Some good examples of the craft to be introduced will be shown, and the work of each child arranged. Afterwards others will be stimulated, by the force of example, to similar choice. Other forms of art craft work will then be introduced by degrees, and you will soon have various centres of activity alive with eager industry, which will act as "growing points" for the whole school. Those children who achieve ready success will act as pioneers, and give great help in carrying on the work.

Ornament is Dependent upon Construction.

One great pitfall of all Decorative work is that the taste for ornament increases until the sense of balance and fitness is lost, and the connection between construction and ornament is forgotten. The first reason for the existence of any object is Use. The extent to which the object can carry out the purpose of its existence must always remain the measure of its success.

This primary reason should never have its weight lessened by any consideration of the claims of ornament. When the constructive planning of the object has been carried to the greatest

perfection, then ornament can be thought about. This applied ornament should not interfere with the constructive necessities of the object. Consequently, the field of ornament is limited, its character is limited, and its treatment is limited, all by reason of constructive need.

The Need for Making Real Things.

Arising out of this last paragraph is the question of what kind of things may be made. Here, again, the pitfall is that we begin to think of the ornament first, and plan designs which are quite good, and then, putting the cart before the horse, we make the object to fit the design ; that is, we let construction become subordinate, instead of dominant, to ornament. It is then but a short step to the making of things which, existing only for the display of ornament, are of little or no utilitarian value, i.e. they cease to be real. Ornament, as well as construction, loses its greatest value when the connection between the two is lost.

The Making of Design.

Here we get a real objective to which the art work of the school can apply its design. Designs can be prepared in the Art Room, after the constructive drawings have been made.

In an elementary school the class teacher generally takes the whole work of the class. This is a very distinct advantage where two or more subjects have to work in with one another ; there is no loss in transmission. In any system of correlation, it is a very sound observation that the teacher who does the teaching should take the correlated practical work.

In secondary schools where, usually, an art master takes the art work throughout the school, practical difficulties arise that are not always easy to overcome. There are none that cannot be got over ; but it is so often the case of using " will not " for " cannot." The same observation applies to Handicraft centres and rooms.

The Handicraft Centre and the School.

If the Handwork master has an art bias, it will be well for all the art craft work to be done under his immediate supervision. If not, then constant consultations should take place between him and the art master. A good deal of the constructive work will be done in the Handwork Room, because of the benches and tools needed. But practically all the ornament to be applied can be done in the schoolrooms and at the school desks.

It is here that group work, or dual work, can be done. Two children, e.g. a boy and a girl, may work together, the boy doing the constructive work, and the girl the ornamental work. This division of labour makes for addition of effect, and is very valuable in showing how each can be mutually helpful.

Equipment.

A very large proportion of the art and craft work is intended for school use, where no great amount of equipment is available. Certain forms of wood carving, repoussé, clay modelling, stencilling, bookbinding, bent iron work, stained wood, basketry, pottery, embroidery, knotting and network, fretwork, wood block printing, poker work, leather work can all be worked quite well on school desks or at tables. The latter are much better for all this work, and in schools of the future will become more numerous.

In each case the equipment is given as each craft is dealt with. It will be found that it is not extensive and involves comparatively little outlay. As it is not recommended that all children should be doing the same work at any one time, few sets of any one lot of tools will be needed. This helps with the storage of tools. These should be in separate racks, easily accessible, so that each child can get the tools he or she needs at any time. A special Hand-work Room in a school renders much more easy the problems of storage.

Some care is needed in the storage and care of materials for craft work.

Stains, paints, and brushes need separate and careful accommodation. Both water and spirit stains evaporate when kept in open vessels, so they should be kept in closed vessels. Children will generally be able to supply all the bottles needed.

French polish and varnish should be kept in corked bottles and protected from the light.

Oil paints can be kept in the air-tight tins in which they are sold. Brushes are soon ruined by lack of care. Oil paint brushes are kept best in jars containing water to keep the air from them. Varnish brushes are kept best in jars containing linseed oil. Polish brushes and rubbers should always be kept in air-tight vessels.

It is essential for orderly working that adequate provision be made for the storage of finished work, and especially when several classes are doing practical work during the week. A large cupboard with a shelf for the work of each class should be provided.

Payment for Materials.

It not only reduces the costs of working, but extends the range of possible materials, if children are allowed to pay for the materials used in the articles they make. This practice also has the advantage of emphasizing the child's responsibility in respect of his work, and towards his parents. It helps the student to choose something that is real also.

The teacher will exercise a good deal of discretion in apportioning the cost. No child should be penalized for poverty; and genius is no respecter of pockets.

General Notes.

For many of the crafts mentioned, work can be done on the school desks ; but in the case of some, e.g. wood carving, repoussé, bent iron work, a bench board is essential. This can be of the type recommended for wood carving, and can be made to fit over the entire desk—whether the desk is single or dual. It can be fastened on the under-side by means of wooden buttons.

The making of apparatus for craft work in the Practical Instruction Room should be encouraged. Much can be done in this way to help in the work, and it is a perfectly legitimate thing to do, because the things made are real things that arise out of real needs.

In bookbinding, for example, sewing frames, presses, ploughs, are all pieces of apparatus that intelligent and capable boys can make. Repoussé tools can also be made quite easily and simply.

CHAPTER III.

WOOD CARVING.

It is not at all necessary to associate Wood Carving with elaborate and intricate design and very advanced decorative or even figure work. The spirit of ornament can be expressed quite well and effectively by simple lines and elementary grouping.

Wood Carving has many aspects and these have been well expressed through the centuries of man's evolution. From these varied styles we can take forms of carving that will fit the development of any child who may wish to express himself through the art of Wood Carving.

There are three main kinds of Wood Carving suitable for school use—

(*a*) Chip Carving.
(*b*) Incised and Low Relief Carving.
(*c*) Some kinds of Higher Relief and Carving in the Round.

In all these kinds both simple and difficult carving occur. The pupil and the teacher must jointly decide which lie within the student's ability.

I.—CHIP CARVING.

Description.

Chip Carving has been said to belong to the childhood of the world. In this respect it is suitable for handwork in schools. Yet it would be a mistake to think that success is easily attained. As a concept, chip carving may belong to the world's childhood, but its execution needs care as well as the skill that comes from practice.

Analysed it consists of one chief element, shown in Fig. 9, page 12, and which may be called the "triangular pocket." By repetition and variation, this pocket can produce some very striking effects, and very remarkably illustrates the point that simple lines, simply arranged, can give satisfactory effects.

Early specimens of savage ornament can always be found in museums, especially those which, like the Horniman Museum at Forest Hill, give prominence to ethnographical exhibits.

The designs are made by chipping out various pieces of wood by means of vertical and sloping cuts, and the design can be considered to be either the series of pieces cut out or the wood that is left between these cuts.

The structure of chip carving designs makes it possible to extend them indefinitely in every direction, and they are suitable for borders, edges, bands, and the filling of large spaces, regular or

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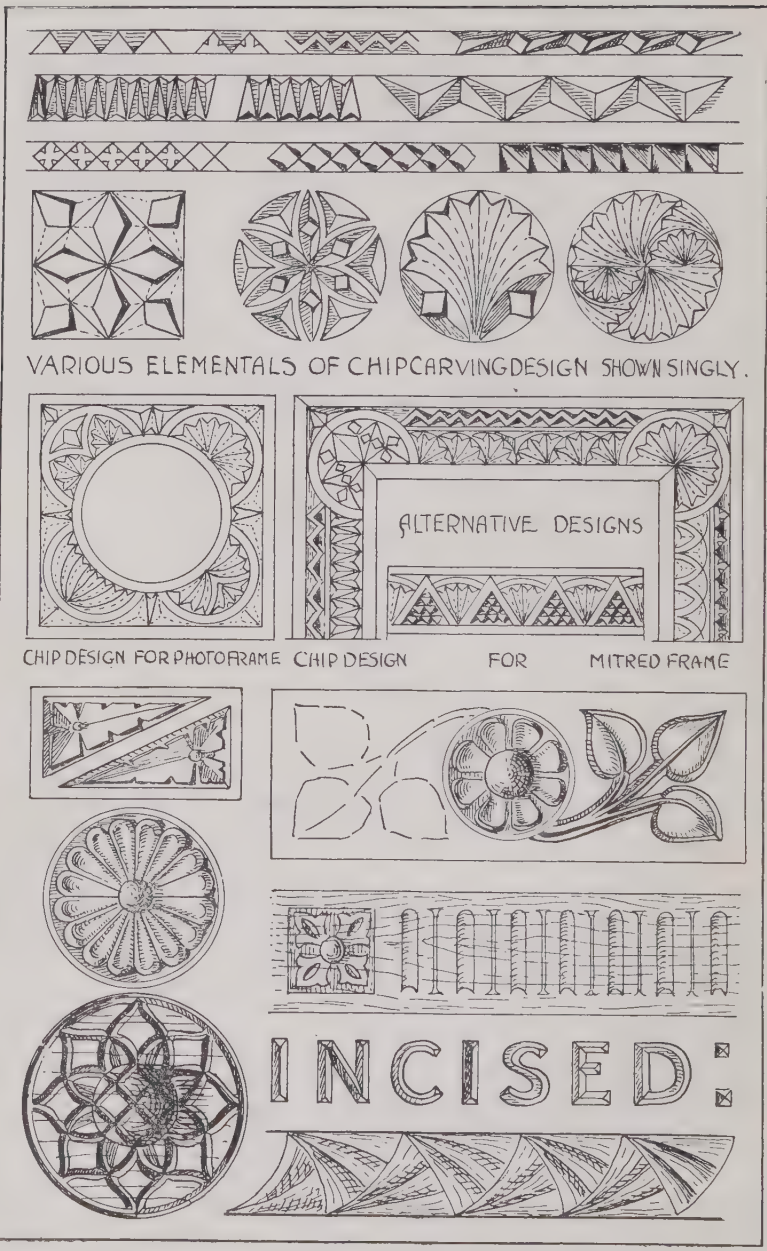


Designs for Chip and Incised Carving.

irregular. As chip carving does not cut into the surface very deeply or widely, flat surfaces such as stool tops, trays, and table tops may be ornamented with it. It is not very suitable for large objects, because the nature of the designs appears to be somewhat trivial compared with the size of the articles.

Tools.

The tool equipment is small. Much chip carving can be done with a knife; if a veining tool be added a much wider range of design is possible, while with a V tool the work can be much more quickly done. Some chip carving designs require the use of gouges. We can give, therefore, three separate equipments for one person.

Tool Equipment No. 1—

1 *Knife.* The kind known as a Sloyd knife (Fig. 1) is good and is recommended. There are two or three types of knives specially manufactured for chip carving, which can be obtained from tool dealers and artists' colourmen. The carving tool known as a skew tool can be used instead of a knife (Fig. 1*a*).

Tool Equipment No. 2—

A knife.
A veiner (Fig. 2).
A V tool (Fig. 3).
A nail punch (Fig. 4).

Tool Equipment No. 3—

A knife.
A veiner.
A V tool.
A nail punch.
A gouge, No. 4 × $\frac{1}{2}$″ (Fig. 5).
A gouge, No. 7 × $\frac{1}{4}$″ (Fig. 6).
1 pair cramps (Fig. 7).

The cramps may be included in all the equipments; but with the lighter work a board which can be placed on a desk, as shown in Fig. 8, will be found necessary. A larger board to fit on a dual desk is sometimes necessary, and this will accommodate other crafts also. Fig. 8*a* shows a suitable board of this kind with a wedge vice which will be most useful for holding many kinds of work.

Materials.

Chip carving is best done on a close-grained wood of a texture that is not too hard.

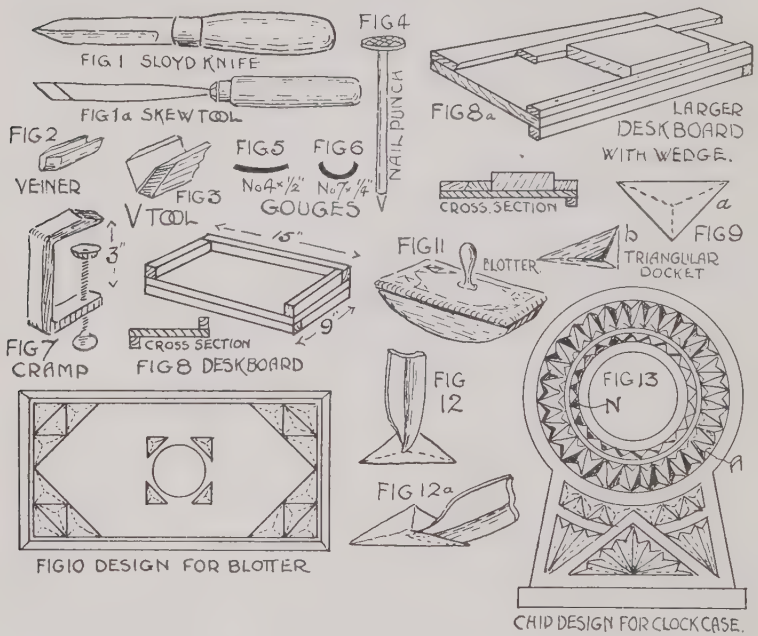
Lime is very suitable; but is not a common marketable commodity. Canary wood is quite ideal, provided the texture is not spongy, which is sometimes the case. Satin walnut also is very good, and is perhaps better than Canary wood, because its grain and texture are generally firmer. A drawback is that the wood warps, and therefore should be well framed, and not used in small separate pieces.

American walnut is a very good wood for this work, and has the advantage of being well and easily finished by treating with raw

linseed oil, when the grain is brought out well, and the resultant colour is good.

Description of Particular Examples.

The actual working of three designs is now described, illustrating one example of each kind of chip carving.



CHIP CARVING DETAILS.

Design I. Fig. 10 shows a design for a hand blotter (Fig. 11) that can be worked entirely with a knife. The stages in the work are as follows—

(1) Prepare the design, correct it, and adjust it. Then draw it on the wood.

(2) Take the knife and insert the point in the centre of each triangular pocket (Fig. 12); press it into the depth you wish to cut, say, $\frac{1}{8}$ in. Then take the knife over in the direction of the angle, to the position shown in Fig. 12*a*, and now a sloping cut will be the result, increasing regularly from zero at the angle to $\frac{1}{8}$ in. at the centre. This is done to each angle, and then we are ready for the next stage.

(3) With the knife, commence cutting away the wood that lies

between any two downward cuts. Do it in stages, and cut "with the grain" to get a smooth surface. The result will be an inverted hollow pyramid. The combination of these pyramids makes the design.

Other cuts can be made with a knife, and it will be a matter of great interest to experiment on spare pieces of wood. The great essential is that the cutting should be clean and the surface smooth.

(4) The nail punch is used to make a matted ground where necessary. A single-pointed punch makes a more satisfactory ground than a punch with more points.

Design II. Fig 13 shows a design that can be achieved with a knife (Fig. 1), a veining tool (Fig. 2), a V tool (Fig. 3), and a nail punch (Fig. 4).

In this case each triangular pocket is surrounded and separated from other pockets by a shallow groove cut with the veining tool. The procedure is as follows—

(1) Draw and correct the design, and put it on the wood.

(2) With the veining tool, cut out the main lines of the design with a light touch. The tool is taken quite lightly over the surface, just, as it were, skimming it.

(3) The wider triangular pockets are cut just as described for design No. 1. The narrower pockets with the ends left in, as at *A*, Fig. 13, are done in this manner.

An enlarged view of one pocket is given in Fig. 14.

At *A* insert the point of the knife and draw it over until it reaches angles *B* and *C*. These are the only vertical cuts made. Now with the V tool begin at the angle *D* and, gradually deepening the tool, cut out the bulk of the wood, finishing up at the points *A*, *B*, and *C*, leaving the end in solid. It will be seen that the advantage of the V tool is that it cuts both sides with one stroke. Then with the V tool held over, first to one side and then to the other, cut away the wood down to the veining line.

The row of cuts at *N* (Fig. 13) is done with the knife only.

(4) The punching, if required, is done as before.

Design III. Fig. 15 gives a design which needs the tool equipment No. 3. This extends the range of designs, and the introduction of curves gives much greater interest, by affording greater contrast, and getting away from the monotony of straight lines.

The procedure is—

(1) Draw and correct the design, and put it on the wood.

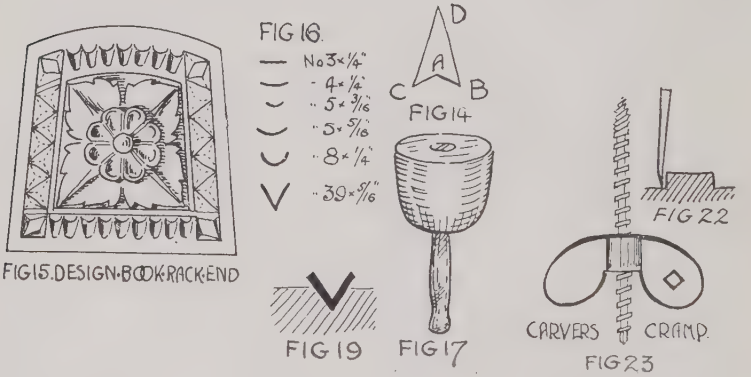
NOTE.—For geometrical designs it is best, after having thoroughly worked out the design, to draw it direct on the wood. For designs that have free curves in them, it is better to make a paper tracing of one design, and then to trace it by means of carbon paper on to the wood.

(2) With the veining tool outline the design; this means that practically all the sunk pockets are "edged" with a veining line.

(3) The pockets are now cut; these are cut on the lines of those already described. Circular buttons are cut by "setting in" with the appropriate gouge. Veins on leaves are cut by a V cut taken along both sides of the vein; and the surface of the leaf is cut with the flat gouge. Edges are serrated by nicking with a V tool, or a veiner, or with a knife.

(4) The punching can now be done. Single-point punches part the fibres and do not bruise them, and are therefore to be preferred

NOTE.—In these days, when "waste material" seems to have been discovered for school work, it is of interest to know that veining tools can be made from umbrella ribs. These can be cut to length, tempered, sharpened and handled, and they make good tools.



DETAILS OF CHIP CARVING AND OF TOOLS.

The Further Road.

As a rule, it will be found that, once a start has been made, the road ahead unfolds so easily and naturally that the further steps to be taken present themselves too clearly to be mistaken. It is so unmistakably the case that "when the pupil is ready, the teacher is there."

Practise assiduously; take every opportunity of seeing good work; get instruction from a good teacher; and always have some work on the way that will "stretch" you.

Suggestions for designs will follow visits to museums where good examples of savage ornament are housed; from books on chip carving; and by study and concentration from one's own inner consciousness.

The illustrations on page 10 will help to give further ideas of what is possible. As a rule, chip carving is applied to smaller, rather than to larger, articles; it is not quite in harmony with the importance of larger objects. Such things as picture frames,

calendars, pin trays, stools, small tables and stands, book shelves, tea trays, and serviette rings are suitable for chip carving.

Bibliography.

Chip Carving. Eleanor Rowe. (Batsford.)
Wood Carving. "Chip Carving" section by H. Turner. (Cassell).
Chip Carving as a Recreation. W. Jackson Smith. (Upcott Gill.)

Cost.

(*a*) *Capital Cost.* Carving tools which in 1914 cost 9d. now cost 1s. 9d. The capital cost per set for Tool Equipment No. 1 will be 2s. 9d.; for Tool Equipment No. 2, 6s. 9d.; for Tool Equipment No. 3, 11s. 6d. at the present time. This includes the desk board in each case.

(*b*) *Annual Cost.* For twelve children the annual cost would be about £2 10s.

A class set of tools is a great help; and it will be found that this will grow gradually as the need arises in individual cases. Then the class set will be really associated with the needs of the class. Extra tools will also be needed that are not in the individual sets, but which are necessary to carry out some design that has been thought of, and that is not quite like the usual stereotyped chip carving.

II.—INCISED AND LOW RELIEF CARVING.

Description.

Incised Carving is so named because the outline of the design is incised with V and other shaped tools, and there is no external ground; the design is inside the incised outline, and is modelled as if it was in relief; the amount of relief being the depth of the incised outlines.

Low Relief Carving can have a definite ground, but it is only taken to a small depth, and the modelling is delicate and fine.

Both these types of carving are distinctly useful. With a small pattern, such as a diaper, the flat horizontal surfaces of tables, trays, and stools may be ornamented.

Bands, dado rails, picture mouldings, pilasters, shelf edges, frame work, picture frames, and friezes are all objects that offer suitable fields for these types of carved ornament.

Tools.

To commence with, individual sets of six tools will enable a student to do a large variety of work. These tools are as follows—

One each of No. 3 × $\frac{1}{4}$″
No. 4 × $\frac{1}{4}$″
No. 5 × $\frac{3}{16}$″
No. 5 × $\frac{5}{16}$″
No. 8 × $\frac{1}{4}$″
No. 39 × $\frac{5}{16}$″
(Fig. 16).

1 nail punch (Fig. 4).
1 mallet (Fig. 17).
1 pair cramps (Fig. 7).

NOTE.—Any tools in the sets given above that are duplicated in any other set can, of course, be struck out, if it is intended to do all the types of carving described.

The desk board (Fig. 8 or Fig. 8*a*) is also necessary.

To keep the tools in sets, one of two things may be done. The boys can make a box for each set, or the girls can make a tool case. Each set should be numbered, as thereby the work of keeping the tools will be made easier.

Materials.

Almost any wood that one can get hold of will do, but the hard woods are the best. Oak, American walnut, lime, canary wood, satin walnut, Kauri pine, yellow pine, and teak would all do quite well.

Description of Particular Examples.

The method of tool work adopted will influence the design (*see* Chap. XIX on Design). In this case, to take the incised carving

FIG 18 DESIGN FOR INCISED CARVING CUTS AT A WITH V TOOL.

first, the method of cutting the outline will influence the design in the direction of making it flow in longer sweeping curves, to render it capable of being cut with a V tool. A more cut-up edge will be possible within the outside curve, and will come under the head of Modelling.

In Fig. 18 is given a design suitable for incised carving.

First Step. Take the V tool and hold it in the right hand, with the end of the handle pressing into the palm of the hand, and with the fingers of the left hand gripping and guiding the blade.

Then apply it to the outline and, taking short cuts to a depth of $\frac{1}{8}$ in., incise it all the way round.

The V tool will be held level as regards its cross section (Fig. 19, page 14), and the aim is to get a line of uniform depth and of good unbroken curve. Small curves and broken edges have to be cut with the gouges used in a vertical position.

Second Step. The "modelling" can now be proceeded with. This is the process that deals with the shaping of the design, and

by splitting up the surface receiving the light, separates the light by uneven reflection, and so produces the light and shade effects. It is by the perfect balancing of light and shade that the best effects are arrived at. Take note of the position in which the carving will appear when in use and always keep the carving in this position while the modelling is being done.

Cut along the edges of the leaves and other members of the design, and separate them from each other. Using the gouges, cut the surface of the members of the design, so that they flow and twist and curve naturally and with effect.

All tool marks are not taken off; on the contrary, it is well to use tool marks to emphasize the total effect. They can assist the "flow" of the members; they can carry the eye from point to point in graceful and easy stages; they can split up surfaces naturally; and they render visible the fact that the work is actually carved with cutting tools.

It is impossible to say just how any design should be modelled, because modelling is an artistic and not a mechanical act. It will, therefore, vary with each individual.

Study carved work already in existence; also photographs of work it is not possible to see; and never neglect opportunities of getting advice from recognized authorities.

In all "modelled" carving, previous work in clay will be a great advantage. It is well to model in clay some essential portion of the design, and, when satisfied with it, to copy it in wood.

The design itself shows by its shading one possible type of modelling, and various sections are given which show the shape of the surface at those points.

Do not scrape or glasspaper the surface on any account. This is an act of vandalism that cannot be forgiven.

Low Relief Carving.

This differs from incised carving inasmuch only as it has a definite "ground." This ground is cut by the process known as "setting in" and "grounding," which will be described in the section dealing with Higher Relief Carving.

The modelling is done exactly in the same way as the modelling in incised carving; and the work is similar in every other way, except that it should be more carefully applied to flat horizontal surfaces, as the presence of a definite ground is against stability in reference to articles that are placed on it.

The Further Road.

Very little can be added to what has been said already in this connection under the head of Chip Carving.

Working in clay is of very great help in gaining the conception of, and proficiency in, modelling. Practice will soon enable the

student to overcome difficulties in using tools and in manipulating the wood.

Copying good examples of carving, either from the actual wood or from casts, in pencil or in sepia, will help very much in developing knowledge of modelling.

Attendance at classes is good, because, in addition to the direct influence of the teacher, there is a very decided influence exerted by the work of other students, chiefly unconsciously.

Some very useful designs for low relief carving can be taken from Scandinavian carving—so much of which is based upon the legend of the dragon *Fafni*, and consists of interlacing bodies of dragons ; and from Elizabethan strapwork and Jacobean carving.

Bibliography.

See page 23.

Cost.

(*a*) *Capital Cost.* Carving tools that in 1914 cost about 9d. each now cost 1s. 9d. The total cost of the six tools : nail punch, mallet, cramps, and bench board, will be about 14s.

(*b*) *Annual Cost.* If the work is done in the handicraft centre, or if there is a handwork room attached to the building, the cost will be negligible. If wood has to be obtained specially, then the annual cost, if, say, six students are doing this work, will be about 30s. to £2 ; and this will include tool grinding. If arrangements are in force for the children paying for the materials this annual cost will be nil.

III.—HIGHER RELIEF AND CARVING IN THE ROUND.

Description of Relief Carving.

Higher Relief Carving is in some ways easier than incised and low relief carving. The modelling is easier because, the relief being greater, more space is available in which to get the varying light and shade that is essential to effective carving. In low relief the curves of the surface have to be more subtle, and are more difficult to make, because the margin between hollows and rounds is so much smaller.

Relief carving is carried out by four definite processes, with which a beginner will do well to become thoroughly familiar. After the design has been traced or drawn on the wood the stages are as follows—

(1) *Wasting Away.* This consists in taking the No. 8 × $\frac{1}{4}$ in. tool (Fig. 20, page 20) and cutting away the wood representing the " ground " to a depth nearly equal to the depth of the finished ground. Avoid ragged work, and do not lever up the wood ; always cut " with the grain," so that each succeeding cut is smooth.

(2) *Setting In.* This consists of taking carving tools that will

fit the outline of the design, and, holding them vertically just outside the outline press them in by hand, or use a mallet if hand pressure is not sufficient. Go round the *outline* only, and see that each cut meets the next. An important point is to make the cuts to the right depth for upon this depends the cleanness of the edge and of the ground.

(3) *Grounding.* All the wood lying outside the inset outline has to be cleared away. This is done by cutting it, little by little, first with gouges, and then with flatter tools.

By cutting with the grain slowly and carefully, and taking small chips off, the worker will obtain a clean and smooth result It is not by any means necessary that the ground shall be as smooth as that surface produced by a plane. Tool marks have a certain value, and so long as they are smoothly made and are not too prominent they may be left in. It is a matter of *feeling* as to how far they may be so left, or how far they should be taken in point of smoothness.

Note that after the modelling is done the ground will need some trimming.

(4) *Modelling.* This is the real work of carving, and is where life and spirit can be expressed. It is the real art side; whereas the preceding stages represent the mechanical side, which is wholly necessary, but cold and hard and emotionless.

Modelling has its root in Nature. Plant and other natural form is flowing in its direction, and arranges its surfaces so that a constant play of light and shade is always possible. These characteristics should be seized upon and used in carving.

It is a very great advantage to model the designs in clay, because not only can this be used to carve from, but it allows of some judgment in deciding which is the best method of modelling certain elements of the design.

The first operation is to separate the design into its component parts, sinking those parts that disappear beneath other portions. Then comes the actual modelling. Included in this may be the ground punching and the finishing of the design.

Tools.

It is a great mistake to invest at the very commencement in a large tool equipment, either individually or for class and school work.

Each tool can be used for so many shapes, and can do so much varied work, that the actual tools employed can be reduced to a small minimum.

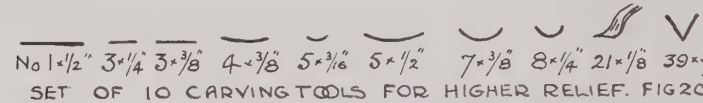
The following ten tools are recommended as being sufficient to do a very large variety of higher relief work and carving in the round.

For the latter, some work will require spoon bit tools, and these are given separately.

No. 1 × $\frac{1}{2}$″
No. 3 × $\frac{1}{4}$″
No. 3 × $\frac{3}{8}$″
No. 4 × $\frac{3}{8}$″
No. 5 × $\frac{3}{16}$″
No. 5 × $\frac{1}{2}$″
No. 7 × $\frac{3}{8}$″
No. 8 × $\frac{1}{4}$″
No. 21 × $\frac{1}{8}$″
No. 39 × $\frac{5}{16}$″
} (Fig. 20).

1 mallet (Fig. 17).
1 pair cramps (Fig. 7).
1 carving board (Figs. 8 & 8*a*).

Tools needed for carving in the round are included in the class equipment mentioned at the end of the chapter; and are included in the cost as part of the class set.



SET OF 10 CARVING TOOLS FOR HIGHER RELIEF. FIG 20.

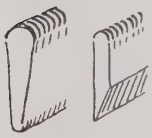


FIG 24.

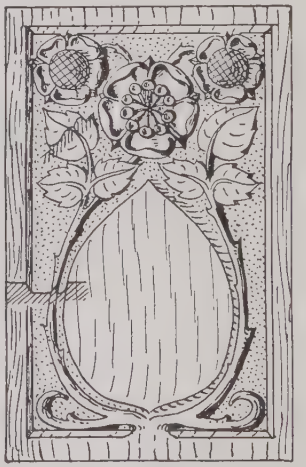


FIG 21 DESIGN FOR RELIEF CARVING.

Materials.

Nearly all hard woods can be used for higher relief; and the notes given on page 16 will apply equally well here.

Oak is one of the best possible woods to use for relief carving.

Description of a Particular Example of Relief Carving.

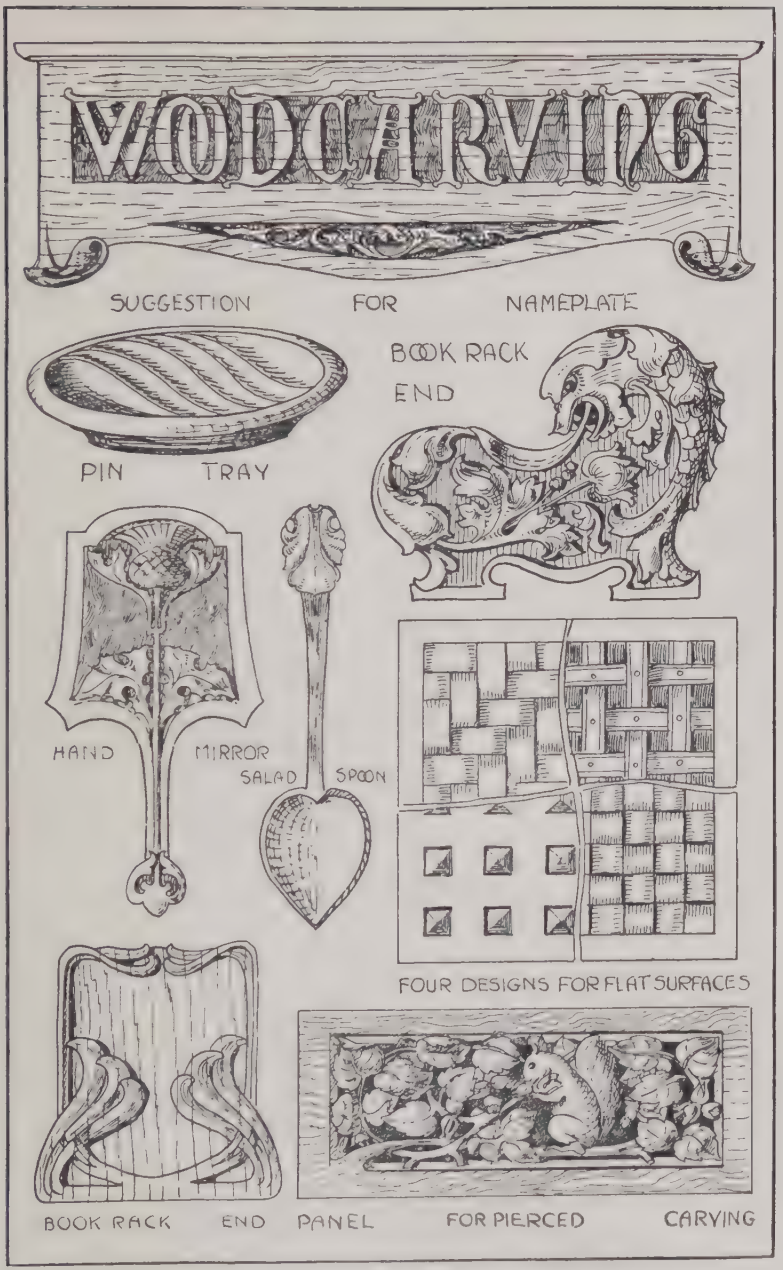
In Fig. 21 is shown a panel design suitable for relief carving. The following are the stages involved—

(1) *Putting the Design On.* Either trace or draw the design upon the wood.

(2) *Wasting Away.* Waste away the ground as already described (page 18).

(3) *Setting In.* Now set in around the outline of the design to the depth required (which, be it noted, will not be so great as is usually imagined, and as is generally decided upon in a first trial).

To avoid undercutting be careful to keep the tools vertical, or only slightly inclined, so that the handle of the tool is over the



Suggestions for Carving.

design ; or to put it another way, and perhaps more accurately, hold the tool with the point directed slightly away from the design, as in Fig. 22 (page 14).

(4) *Grounding.* The ground must now be taken out ; this is done by means of small cuts taken first by the gouges and next by the flat tools.

Get the ground uniformly deep, and level ; but it is not necessary to take the tool cuts out, so long as they are not too prominent.

(5) *Modelling.* Now the work is ready for modelling. As modelling is a matter of taste and artistic judgment, no definite instructions can be given as to treatment. If the design is in any particular period or style, then the modelling must follow that style ; and recourse must be had to good examples of work belonging to the period. But if the design is modern, it can be treated as the worker thinks best.

Do, however, cultivate an eye, and a very keen eye, for crude work, for ungraceful work, and for unfinished work. So much of this is passed as satisfactory at first. Do not be satisfied too easily.

Modelling is largely a matter of making "hollows" and "rounds," and the effective modelling is that in which the proportions and contrasts between the two are good. It may be noted that modelling in which "rounds" predominate is more effective, as a rule, than that in which "hollows" are predominant. *Big "rounds" with little "hollows"* is a good rule. If "hollows" are not put in, the modelling is clumsy, wooden, and altogether devoid of grace.

In modelling leaves, for instance, the middles can be "rounds," and slight hollows can be cut along the edges. These hollows lighten the otherwise heavy and clumsy appearance that the leaves would have.

Fourteenth century Gothic carving illustrates very clearly and thoroughly the statement that carving is a system of cutting "hollows" and "rounds."

(6) *Punching.* The best work is left with the ground cut direct from the tool. But often there appears to be good reason why the ground should be "matted" or "punched." The best type of punching is that which is done with a single point. Commercial carving has its ground punched with a 16-point punch ; but this is for speed, and the objection to it is that it bruises the wood, and produces a surface that is not so pleasant as that obtained with a single-pointed punch.

Description of Carving in the Round.

This is not so difficult as it is often imagined to be. As a matter of fact, with the exception of figure carving, which calls for a high degree of skill and art, it is a fairly easy form of carving.

The object to be carved is cut to shape with bow saw, fret saw,

or by means of a lathe. It is then held in cramps or a vice and carved.

Turned candlesticks can be made in this way; also walking stick handles, handles for inkstands and paper knives; bases and pillars for electric light standards; book racks; lecterns and prayer desks in churches; capitals for overmantels and other furniture.

The Further Road.

See remarks under this head on pages 14 and 17.

Bibliography.

Of books on wood carving there are many. Some deal with practical instruction only, others with the broader field of its philosophy and of its art. Both sides are necessary, and as wide a reading should be obtained as is possible.

Wood Carving Design and Workmanship. George Jack. (Pitman.)
Wood Carving. C. G. Leland. (Pitman.)
Wood Carving. H. Turner. (Cassell.)
Wood Carving (Elementary Lessons). H. Turner. (P. Marshall.)
The Handicraft of Wood Carving. J. Jackson. (Pitman.)
Design for Wood Carvers. H. Turner. (P. Marshall.)

Cost.

(*a*) *Capital Cost.* The total cost of 10 tools, cramps, bench boards, and mallet will be about £1 1s.

(*b*) *Annual Cost.* The cost of the wood and tool sharpening for six students doing higher relief will be from 30s. to £2 in all for twelve months.

Further Notes on Carving.

Finishing the Work. This refers to staining and polishing. Carving should *never* be highly polished nor varnished. What exactly can be done depends on what wood has been chosen.

Oak can be fumed (with the fumes of liquid ammonia, or washed with the same liquid). This produces a nice dark shade. Afterwards it should be oiled with raw linseed oil. Alternatively it may be given two coats of white polish with a brush, and then be polished with beeswax and turpentine.

American Walnut can be simply oiled with raw linseed oil and wax polished.

If staining is needed, then the wood is treated afterwards as described above; that is, it can be oiled (which fixes the stain) and then wax polished, or given two coats of french polish with a brush. Avoid spirit varnish; if it is thought necessary to varnish at all, use hard church oak varnish.

Class Equipment.

In addition to individual sets of tools, certain supplementary equipment is necessary, although it is not always in use. The following is suggested as being a suitable supplementary equipment for class use—

12 ordinary carving tools—
- No. 2 × $\frac{5}{16}$″
- No. 3 × $\frac{1}{16}$″
- No. 4 × $\frac{1}{4}$″
- No. 4 × $\frac{1}{2}$″
- No. 5 × $\frac{1}{8}$″
- No. 5 × $\frac{5}{16}$″
- No. 6 × $\frac{3}{8}$″
- No. 7 × $\frac{1}{4}$″
- No. 8 × $\frac{1}{8}$″
- No. 8 × $\frac{1}{2}$″
- No. 10 × $\frac{1}{8}$″
- No. 41 × $\frac{1}{4}$″

4 spoon bit tools—
- No. 21 × $\frac{3}{8}$″
- No. 43 × $\frac{1}{4}$″
- No. 26 × $\frac{1}{4}$″
- No. 31 × $\frac{5}{16}$″

1 carver's cramp (Fig. 23).
1 strop (leather).
2 slips (Fig. 24).
1 oilstone.
1 oilcan.

The spoon bit tools will be useful if any carving in the round is done, or any high relief that is undercut.

The carver's cramp is useful, because, being screwed into the under side of the wood, it leaves the surface to be worked clear and uninterrupted.

The strop is made of leather, and is treated with fine emery flour and tallow. Upon this strop the sharp tools are rubbed to get their edges quite as sharp as a razor.

The oilstone and slips are necessary to sharpen the tools. The stone and one slip are Washita stones ; the other slip is Arkansas, this latter having a sharp edge to sharpen the V tools and veiners. The oil used is lard oil. All stones should be kept thoroughly clean.

Cost.

The cost of this supplementary set will be about £2 2s.

Other Forms of Wood Carving.

Pierced Carving. This consists, in the first place, of fretting out the designs so that what otherwise would be the "ground" is entirely cut away through the thickness of the wood, and the design appears as fretwork. It is then carved in the usual way.

It will be seen that the amount of relief is equal to the thickness of the wood, and this gives a great scope for flow, and for light and shade. Good examples of pierced carving exist in churches and cathedrals.

It is important to select a full design with little ground, i.e. with little wood to cut away. When designs are pierced, the cut away portion stands out very strongly, and tends to give the design a thinner appearance in the wood than it had on paper.

CHAPTER IV.

REPOUSSE METAL WORK.

Description.

Type I. Designs are drawn on sheet metal, and are beaten out by means of a hammer and various punches which are worked mostly from the back; certain surface work is done from the front, the metal being fixed on a pitch block in both cases. As a rule, steel and brass tracers and punches are used, but sometimes, for high relief and for very wide surfaces and bosses, wooden tools are used.

The outline of the design is drawn with the "tracers" (Fig. 1*a*) on the metal, which has been placed right side upwards on the pitch block. The next step is to take the work off the pitch block and re-fix it with its face downwards; the spaces between the outlines are now beaten with the punches and the hammer. The metal, being ductile, is thus slowly beaten out.

When this has been done sufficiently, the metal is again turned and fixed on the block, and the necessary surface work is done.

Constant hammering hardens the metal and makes it brittle. It then requires annealing; this consists in heating it to redness and slowly cooling.

When the design has been worked, the metal is cut to shape and fixed to its foundation by screws, pins, rivets, or solder.

Then it is brightened, or darkened, and lacquered or otherwise finished.

This type of repoussé is suitable for working in a Practical Instruction Room where there are heavy benches.

Type II. This is a form of repoussé work that may be done on the school desk, and that does not require the pitch block, hammers, or punches; it has the distinct advantage, also, of being a relatively silent craft as compared with the previous type. It is not, however, as might be imagined, an effeminate kind of craft that is devoid of beauty and spirit; on the contrary, it is graceful, effective, and fascinating.

The material used is thin, and therefore no other than hand pressure is needful to shape it; it is for this reason that no pitch block is necessary. Annealing is also unnecessary. Thin copper or brass sheet, and pewter, especially the latter, are used. Instead of a pitch block, blocks of wood, pieces of felt, and plate glass are used.

The design is traced or drawn on, and the work is pushed out from the back, and then worked from the face, just as in the case of the first type of repoussé.

The tools used are not punches, but are like clay modelling tools, made in steel, and handled.

Working on felt or linoleum allows the design to be pushed up in good relief from the back. Sometimes "jewels," in the form of coloured stones, are added. Hat-pin heads, buckles, box corner plates, hinges, escutcheons, paper knife handles, photo frames, serviette rings, ash trays, are among the objects that can be made under this head.

The Tools.

(*a*) *For Type I*—

12 punches of various shapes (Fig. 1).
1 repoussé hammer (Fig. 2).
1 wooden shaping mallet (Fig. 3).
1 pitch block (Fig. 4).
1 Bunsen burner, or blow lamp, or blowpipes and foot bellows.
1 pair shears (Fig. 5).
1 scriber (Fig. 6).
A sandbag.

The pitch block is used to put the sheet metal on so that the latter can be beaten out without damage. It can be purchased separately, or can be made by the enthusiastic worker. A good recipe is as follows—

Equal parts of pitch and plaster of Paris and a little tallow or sweet oil; sometimes a little resin is added. Melt the pitch in an iron pan, add the plaster and mix well, then add the other ingredients.

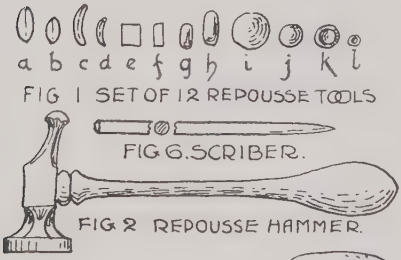


FIG 1 SET OF 12 REPOUSSE TOOLS


FIG 3. REPOUSSE MALLET

FIG 5 SHEARS.

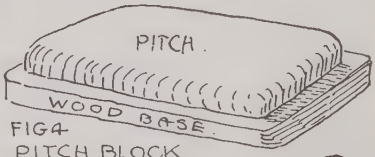


FIG 4 PITCH BLOCK

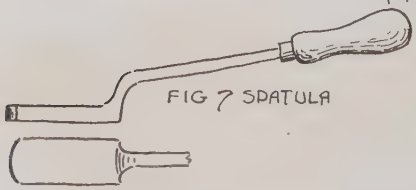


FIG 7 SPATULA

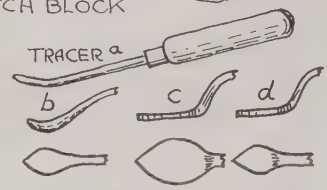


FIG 8. LIGHT REPOUSSE TOOLS.

If neither Bunsen burner, blow lamp, nor blow pipes are available, a tool known as a spatula may be used (*see* Fig. 7). This is heated and used to shape the pitch block and to smooth it.

The repoussé hammer has a thin lance-wood shaft which takes up the vibration and shock.

The repoussé tools can be made from $\frac{1}{16}$ in. square steel rod.

(*b*) *For Type II.* Much work is done with wooden tools; in fact, with care, the ordinary clay modelling tools will do quite well. They must be used carefully, as heavy pressure breaks them. On the whole, it is better to have steel tools, which can be purchased through any art dealer.

Fig. 8 gives four chief tools that are needed in this light form of repoussé. A scriber (Fig. 6); pair of scissors; a hollow punch to make holes for jewels; pieces of linoleum, felt, plate glass, hardwood board, about 8 in. × 5 in. in size, complete the equipment.

The Materials.

For Type I. All kinds of sheet metal can be used, but repoussé is usually associated with brass and copper. Sheet metal of No. 22 gauge and less is suitable. It is to be obtained in sheets 4 ft. × 2 ft., but, of course, smaller sizes can be had, although a relatively higher charge is made when sheets have to be cut.

Pewter, aluminium, and silver are also used.

For Type II. Leaf (that is, very thin) copper and brass, and pewter sheet are the best; the latter especially so. Silver is also useful for this type of work.

For both types coloured stones of many colours, shapes, and sizes are available, but especially for use with the second type.

Description of Particular Examples of Repoussé Metal Work.

Type I.—A Nameplate.

In Fig. 9, p. 29, is given a design of a simple character suitable for working with tool equipment No. I. The following are the stages to be taken—

(1) Draw or trace the design upon the sheet metal. Heat the metal and press it uniformly upon the pitch block, back downwards.

(2) Take a tracer (Fig. 1*a*) and go over the outline of the design. The tool is held with the fingers close to the working end; and the punch is struck by the hammer quickly and continuously whilst it is being moved along the outline of the design. There are curved tracers for quick curves.

(3) Remove the sheet metal from the pitch block by heating, and level the latter. Then heat the plate and press it into the pitch block, face downwards.

Now take the appropriate punches and proceed to beat out the spaces between the outlines to the amount of relief thought to be necessary.

Remember the surface work to be done when the plate is turned round.

What is important at this stage is to get the correct relation between the various parts as regards the amount of relief, and as regards the various planes.

Get a graceful flow of surface, and avoid inequalities caused by unequal punching. These latter are caused by undue haste and unequal force in delivering the hammer blows. Use the hammer quickly, and do not lift it above the punch more than about an inch or so.

(4) Now take the plate off the pitch block, and, after smoothing the latter, re-fix the former, back downwards. Go round the edge of the design with a flat punch and make the design stand up in its full relief; this also defines the design.

Take tools of various shapes that are appropriate, and work the surface. It is this surface work that makes the design full of interest, and it should be done with considerable judgment and delicacy. Get all the curves of height and outline graceful and well balanced. Do not try to get sharp edges; they are not appropriate to beaten metal.

Spaces that need matting or punching should be done now.

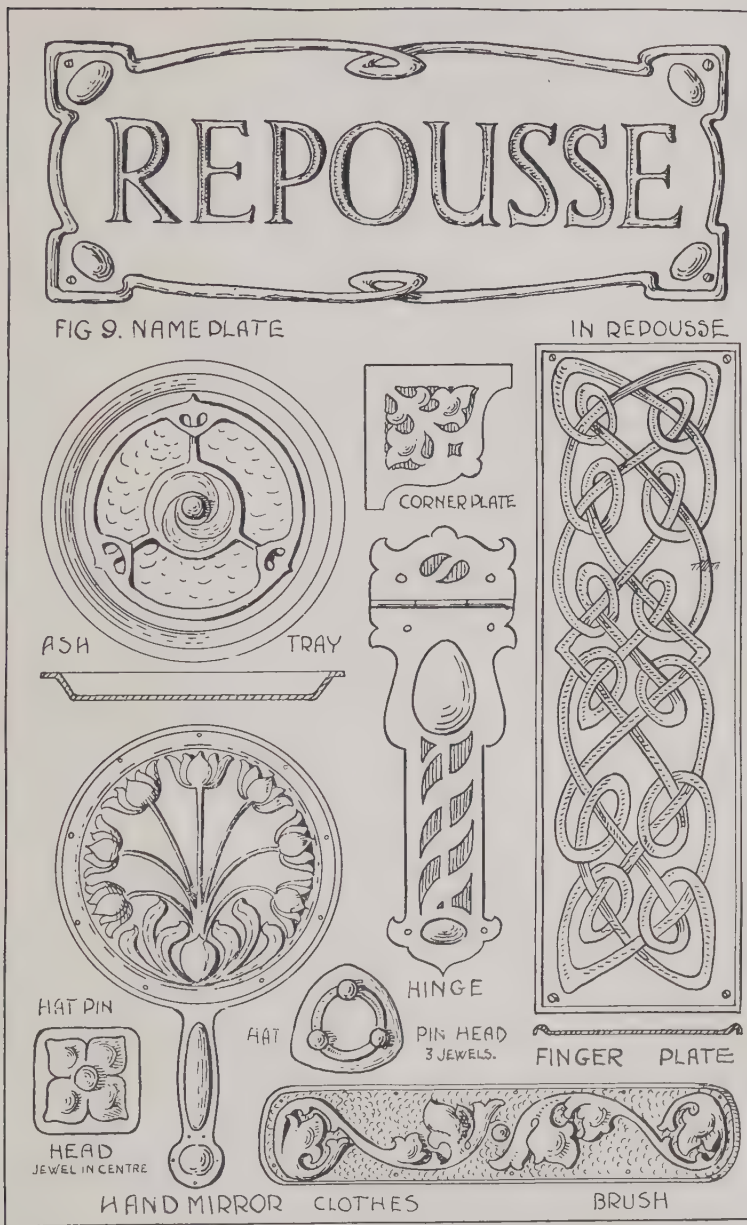
During the progress of these two steps, it is possible that the plate will need annealing. As the hammering proceeds, the metal gets harder and more brittle, as is shown by the gradual appearance of small cracks. It has to be heated to a dull red, and then cooled slowly. This softens it and makes it ready again for shaping.

Tool marks add to the artistic value of the work, if judiciously applied. Only those tool marks that are badly done should be avoided. The whole question in this connection is whether the tool marks *aid* or *hinder* the eye in its survey of the design.

(5) The plate is now taken off the pitch block, cleaned, and lacquered; sometimes it is coloured.

To clean brass and copper, dilute acids are used. Brass is dipped into dilute nitric acid, then washed in running water and rubbed with fine sand and sawdust. Copper is dipped in dilute sulphuric acid, rubbed with fine sand, washed in running water, and dried with sawdust.

There are other methods of finishing, such as burnishing, dead dipping, bronzing, and colouring. Details of all these will be found in books given at the end of this chapter. Lacquer is applied after these finishing operations, to preserve colour and to prevent oxidization. It is applied either hot or cold. Lacquer for metal work is a special preparation, and is best bought ready made. Hot lacquering gives the better results.



Designs for Repousse Work.

Type II.—Serviette Ring.

This form of repoussé is more suitable for work in school, because it does not need a heavy equipment, it is not noisy, and it is well within the capacity of children. In Fig. 10 is given a design the execution of which will touch upon all the points necessary in this kind of work. The method of doing it is as follows—

(1) Draw or trace the design on the metal used. With the tool shown in Fig. 8*a* press in the outline of the design from the face, laying the sheet metal upon the wooden board to do so. All this is done by hand pressure, the tool being held as one would a pen.

(2) Turn the metal over and lay it upon the felt or the linoleum. Using the tool (Fig. 8*b*), press out from the back the spaces within the inscribed outline to the amount of relief that is desired.

(3) Turn the metal sheet over and now put the back on the glass plate, or on the wooden board.

Use the flat tool (Fig. 8*c*) and press down the ground and define the edge of the design.

FIG. 10. DESIGN IN LIGHT REPOUSSE FOR SERVIETTE RING

Fill the pressed out parts from the back with a mixture of glue and plaster of Paris. Then with any tool that seems to be capable of doing what is intended, shape the surface, and model it to produce those variations of light and shade that mark the best work.

Mat or punch the ground, and if coloured stones are to be used, cut the holes with the hollow punches.

With the scissors cut the metal to its correct shape.

If any piercing is necessary, i.e. if the design is to be fretted, this will be done now, and the edges filed and smoothed.

(4) Clean and colour (if necessary), and lacquer the work; pierce the nail holes and secure to the wood or other base.

Glue the stones, if any, to the base before the metal is placed.

Exposed parts of the base may be stained or covered with some suitable material.

The Further Road.

Very constant practice, close observation, and discriminating reading of books sum up the further road. As a rule, the tool operations needed to carry out any of these crafts are not numerous, and are quite easily assimilated. After this, there is little new to learn, and "to consolidate the gains" is the greatest task; this means "practice, practice, practice."

If there are classes available, by all means attend them ; and, being aware of all your imperfections, don't hesitate to get to know from your teachers all that bears upon them.

Bibliography.

Metal Work. C. G. Leland. (Pitman.)
The Art of Repoussé. J. G. Gawthorp. (Batsford.)
The Decoration of Metals. J. Harrison.
Chapter in Metal Work. Adam and Evans. (Ed. Arnold.)
Guide to Relief Modelling in Metal. Clara Rath. (Upcott Gill.)

The Cost.

(*a*) *Capital Cost.* Type I. The cost of all the tools and apparatus mentioned on page 26 is about 25s. at the present time.

Type II. The tools and equipment for this kind of repoussé cost about 9s.

(*b*) *Annual Cost.* Both Types. For six pupils the annual cost will be about 30s. each type.

Class Set. Tools not mentioned, but that make their need felt from time to time, will be added to the sets already mentioned. These will form a class set to supplement the work of the other tools.

In the case of repoussé it is well to get these tools as the need for them arises, and thus automatically to collect a class set.

Many can be made by students, especially for Type II.

CHAPTER V.

CLAY MODELLING.

Description.

A MORE natural craft than that of clay modelling could not be thought of. It has been well said that it is "a natural craft in a natural material, operated by natural tools." Clay is a natural material, surely enough, and fingers are humanity's original tools.

Clay modelling consists of building and pressing clay to represent real objects or ideal conceptions. The clay is operated by the fingers, and there is little need to use other tools than these.

The method of working is to build, and not to carve. Take, as an example, the modelling of a tomato. A central core would be made a little less than the finished size of the object. Then the clay needed to form the raised parts is added in small portions until the right height has been arrived at.

Clay modelling is used for many varying purposes. The potter, by means of the potter's wheel, models clay for pottery. The sculptor uses it to fix the form of his conceptions. The decorative artist uses it to model designs for friezes, pilasters, terra cotta ornament, mouldings, and other similar ornament. In school it is used for its rich educational possibilities, both as a means of developing latent powers in children, and of illustrating history, geography, and other school subjects.

As a school craft it is easily the first and the most widely employed. It has possibilities that make it equally suitable for infants and seniors alike. It is also the most economical of any school craft.

Clay is not "used up," but can remain for many years without requiring any addition. The more it is worked the better it gets.

Few tools are needed, and fingers and thumbs are always available. Its plasticity makes its use an extraordinary fascination, and its possibilities as an educational medium are greater than that of any other material.

Clay is not difficult to take care of. If it is hard when it is delivered, the best way to deal with it is to break it up and pound it to powder. Then add water, which the clay absorbs; if it is then not soft enough, add more. It is of the right consistency when the thumb easily makes an impression in it without picking up any clay. After this, it is kept in condition, after it has been replaced in the clay box, by covering it with damp cloths. It is best kept in a zinc-lined box or in a galvanized dust bin with a lid.

Keep it in balls about 3 in. diameter, which will be enough for one individual to use for school work in an ordinary lesson.

The clay becomes hard after use, unless precautions are taken to keep it soft by covering the unfinished work with damp cloths. When the work is quite finished and it is desired to keep it, it can be left to dry, or a plaster cast can be made of it. If it is pottery, it is baked in a gas muffle (a kind of oven used for burning enamel), or sent to a pottery factory, where it can be "fired."

Sponges are used to keep the clay and the fingers damp during the work, because the heat of the hands and the comparative dryness of the atmosphere rob the clay of its moisture, and it then works up "short," as is shown by the development of small cracks.

Clay can be kept for many years, and is quite clean even after a great lapse of time. Where many children use it, it is desirable to mix a little disinfectant with the water.

Tools.

Fingers and thumbs ; and the boxwood tools shown in Fig. 1.

A toothed lath, either of wood or zinc, as in Fig. 2.
A sponge.
A board 15″ × 10″ (Fig. 3).
A hog's-hair brush.

A clay box that is zinc-lined, or a galvanized dust bin with lid.

The Materials.

Clay is usually sold in two colours—natural or grey, and terra cotta. It is a matter of taste which colour is preferred. Perhaps the grey is the most frequently used. It is sold by the hundredweight, and 1 cwt. is not too much for the use of a large class.

Clay is the better for use, and should be beaten and rolled and worked with the hands as much as possible, care being taken to keep it damp. If the clay is too soft, i.e. if it is sticky, powder some hard clay and knead this into it. Lay the clay out flat, as in making a slab, and powder its surface ; then roll it up and knead it. Repeat the whole process until the clay is of a satisfactory texture.

If it is too hard, beat it out with a mallet, sponge the surface with water, and roll ; keep repeating until the clay is soft enough.

Potters say clay is alive, and well-worked clay in perfect temper feels as if it is ; it seems to know what is required of it, and it is easy to imagine that it is helping you all it can.

Plaster of Paris is needed for casting, in superfine, fine, and medium qualities.

Soft soap and oil are also required for casting, but as this properly belongs to more advanced work it does not come into the field that this book covers.

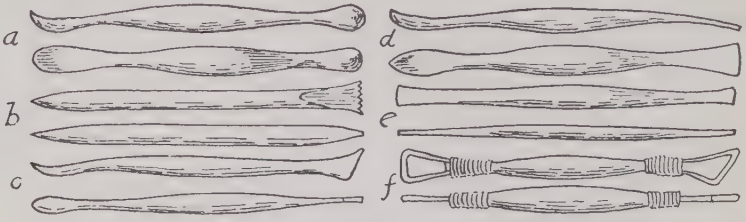


FIG 1 6 CLAY MODELLING TOOLS SHEWING TWO VIEWS OF EACH

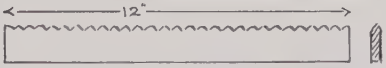


FIG 2 TOOTHED LATH FOR SCRAPING

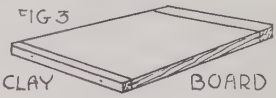


FIG 3
CLAY BOARD

FIGS 5+6 SHEWING TWO METHODS OF COMMENCING SLAB

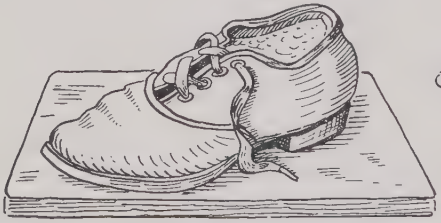


FIG 4. CHILD'S SHOE MODELLED ON SLAB.

FIG 7. DESIGN FOR VERTICAL SLAB

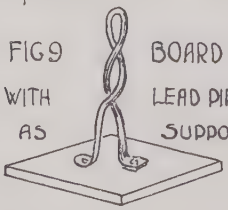


FIG 9 BOARD WITH LEAD PIPE AS SUPPORT

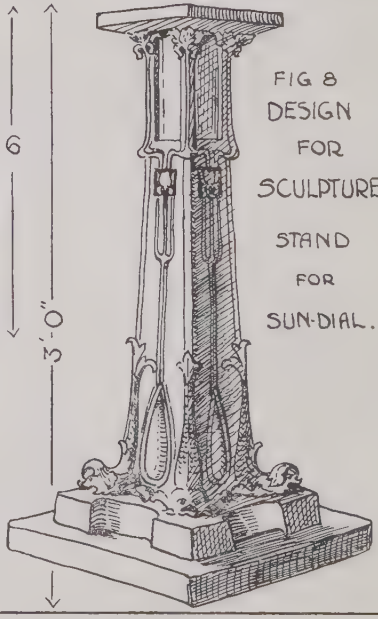


FIG 8 DESIGN FOR SCULPTURE STAND FOR SUN-DIAL.

Description of the Actual Working of some particular examples of Clay Modelling.

Three examples are given, and all the stages necessary to their complete modelling are described.

The three examples are—

(*a*) A child's shoe, mounted on a slab.
(*b*) A design for a vertical tile.
(*c*) A model for sculpture.

(*a*) A Child's Shoe. (Fig. 4.)

(1) Take as much clay from the clay box as you think you will need. With the wet sponge, damp the modelling board. This prevents its absorbing moisture from the clay.

A slab will be made first. This can be made in two ways. The first method is to make a series of rolls about $\frac{3}{4}$ in. diameter and as long as the slab is intended to be, and as many rolls as will make the width of the slab (Fig. 5). Lay them side by side, pack well together, and level them. Packing is a very important and necessary operation that must be well and thoroughly done. As you work keep damping the fingers, and it may be necessary occasionally to sponge the clay.

When the surface of the clay is as level as the fingers can make it, take the toothed lath, and scrape the surface from side to side and from corner to corner, in order to level it. Wet the thumb, and smooth the surface of the slab. With the smooth edge of the lath cut the slab to the sizes required, and leave it to dry a little.

The second method of making the slab is to commence at the top left-hand corner and work downwards and to the right, adding small pieces at a time and packing well. Fig. 6 shows the slab begun. The finger and thumb keep the edges well packed and at right angles; and the slab, when complete, is finished exactly in the same way as by the first method. It is well to have the slab much drier, so leave it until it is leathery.

(2) Now draw carefully the plan of the shoe on the slab—either to full size, or larger or smaller, as you may desire.

Keep the shoe on the modelling board so that it can remain in the same position all the time for sighting. Decide which is the highest point, and begin to build up the clay at that point until it is of the height required. It is built up little by little. The first piece put on should be well pressed into the slab so that it is part and parcel of it, and each succeeding piece of clay is treated in the same way, so that ultimately the shoe is a homogeneous mass of clay.

Now build the clay so that you get a side view outline like that of the shoe. Turn the shoe end-wise, and get an outline corresponding to that. View the shoe from various angles, and get

the model to look exactly like it. It will be found that these additions, being put on with force, will have altered previous outlines, and one has constantly to be looking at them, and testing them again and again, until one finds that the percentage of error is diminishing. It is well to build up the shoe solid, and to undercut any parts necessary afterwards.

Get the body of the model well done, with its curves and proportions corresponding to those of the shoe. Then let the model dry somewhat, as it is easier to do the surface work when it is harder.

(3) The surface work now remains to be done. This consists of the eyelets, the laces, the binding of the shoe, the formation of the sole, and the smaller crevices and curves and other marks, including the seams. These are done with the modelling tools.

At this stage some "carving" has to be done. This is inevitable, and constitutes a legitimate exception to the general rule.

The tool will be damped slightly, just as the fingers would be.

The interior of the shoe is better left solid; the clay can be sunk about $\frac{1}{8}$ in. below the edge.

(4) The shoe can now be undercut. A wire tool (Fig. 1 *f*) is a very good tool to use for this work. The spaces under the instep and the toe can be thus cut away.

The laces should be arranged on the body of the shoe so that there is no complete separation of them from the shoe, because such a thin piece of clay would dry and become quite brittle.

(5) Take a hog's-hair brush, dip it in water, and use it under the undercut portions to get them smooth.

The model is now finished.

(*b*) A Design for a Vertical Tile. (6 in. × 6 in.) (Fig. 7.)

(1) Make a slab 7 in. × 7 in. × $\frac{1}{2}$ in., as already described. When it is finished, let it dry a little, and while it is drying prepare the design.

(2) When the design is finally arranged, it should be drawn lightly on the slab with the point of a modelling tool.

Then, first, the masses of the design are arranged. In this case the flowers are the principal masses. A little clay is pinched off the large ball with the thumb and finger, and, with them, slightly rolled into a small cylinder. Then it is placed where needed, and pressed slightly home with a sliding movement of the finger. The relief in a tile of this kind is small, so that little clay is required.

The stems are now placed in position. These are made in the form of small rolls, and skilfully placed on the line, and arranged carefully with regard to the curve.

It is very necessary that the added clay shall become part and parcel of the slab, so that care must be taken to press the clay well in.

The work can be left for a little while to let the clay harden

slightly. It will be found that a more delicate modelling can be obtained when the clay is stiff enough to resist a fair degree of pressure.

(3) Now remains the modelling. In this design there is very good scope for the artist, and a great amount of detail and subtle modelling can be got in.

Try to keep as full an effect as you can ; this means that there will be more rounds than hollows.

During the whole of this time a sharp eye has to be kept upon the size and the shape of the tile, because the constant downward pressure exerted during modelling tends to push the yielding clay out sideways.

Sometimes a slab that has to be kept to a definite size is held by means of laths around the sides. In this case the slab can be made by pressing clay into a space so enclosed ; then, by taking the ruler across the top, scraping off the superfluous clay, a slab of uniform thickness with a perfectly level surface is formed.

See that the outlines of the design are well formed and beautifully curved, all the angles clean and definite, and that all the delicate swellings and undulations of surface are as perfect as you can possibly make them.

Now let the tile dry for firing ; alternatively, a plaster cast can be taken of it.

(*c*) A Model for Sculpture : A Garden Sundial Pillar.

This will give opportunity to bring into action a higher type of art interest and ability.

Children are creative artists, and it is always well to give them as many opportunities as we can to manifest any power they feel they have in them struggling for expression.

(1) This pillar will stand about 3 ft. high. A model will be sufficient for us, and we shall find that a pillar modelled one-third full size will be quite convenient.

Form two slabs, and fix the smaller on to the top of the larger, taking care that the upper slab is pressed well into the lower. An alternative method is to make one slab for both steps, modelling its edges so that it shows two steps.

Through the centre fix a lead pipe, bent so that it will hold the clay (Fig. 9). This will help to keep the clay in position, otherwise it drops considerably.

(2) Begin now to build up the pillar. This is done in just the same way as before, namely, by adding small pieces of clay and packing them well.

Always keep one hand on the clay to receive the pressure exerted by the other. This keeps the clay from getting out of shape by bulging. Whatever is done, it will be found that the clay falls from day to day. This must not discourage ; it is inevitable,

especially as we have to keep the clay damp in order to have it in order for working.

As the clay is built up, the spaces for the panels can be made, and, in fact, the pillar will, when this stage is finished, present an approximation to the finished model. Let the model dry somewhat at this stage.

(3) The modelling of the detail is now proceeded with. Some "carving" has to be done, but, generally speaking, there is little need for anything but the addition of clay and the shaping of it. Small detail is done with the modelling tools.

If any clay is to be added to the pillar, and the latter is found to be hard, it can be softened by wrapping a wet sponge round the part; or by boring a hole a little above and pointing downwards, and filling with water.

The Further Road.

Very constant practice in modelling a very wide range of actual objects is the best direction that can be given.

Plant form is a very fertile field, and time studies should be made of all kinds of plant objects. Again, the animal kingdom is full of suitable matter.

The study of living form is most fascinating. For instance, put a rabbit into a room, and make sketches of it in various positions. It will be found that this is not only a very sporting affair, but infinitely valuable in developing technique.

Then from these sketches make a model of the rabbit in some characteristic position.

When this has been done up to a certain unfinished point, get the rabbit in again, and correct the outlines and proportions and add what details are needed.

Much can be done by the individual, and working without help really does strengthen a belief in one's own efforts.

At the same time pay close attention to other work; visit museums and art galleries, and form the habit of judging the artistic merits or demerits of art craft work from the standpoint of your own knowledge.

Attendance at classes, the reading of books, and continual discussion help very much also.

Bibliography.

Clay Modelling for Schools. Stewart Taylor. (Pitman.)
Clay Modelling for Juniors. F. H. Brown. (Pitman.)

The Cost.

(*a*) *The Capital Cost.* For a unit of twelve scholars, the capital cost will be about £1.

(*b*) *The Annual Cost* for the same unit would be practically nothing. The clay can be used over and over again and is practically indestructible. A few tool breakages are all that would come under this head. If casting is to be done (which is not described here, as it belongs to more advanced work), then there would be the additional cost of the plaster, which would not be a heavy charge.

CHAPTER VI.

INLAY AND OVERLAY, AND OTHER GLUED ART WOODWORK.

INLAY.

Description.

INLAY is what its name actually implies. It is literally the laying in of wood, metal, tortoise shell, and mother of pearl into larger pieces of wood.

The smaller pieces are arranged according to the laws of ornament, in decorative manner, and the woods themselves help in the scheme of ornament because of the range of colour they show.

Much inlay has been done that is elaborate and difficult; but there is a very wide field from which we can choose designs for inlay that are good, sound ornament, and that are not at all difficult of execution. It is worth while again to emphasize the undoubted fact that good ornament depends upon a simple and restrained arrangement of lines rather than upon a highly intricate combination of elements.

The Craft of Inlay consists of having pieces of wood and other materials, either singly or built up to form a design, glued into holes that have been cut into a larger piece for the purpose of ornament.

The depth of the hole should not be more than $\frac{1}{8}$ in., and it may be much less. Bands and shells and centre-pieces can be bought for inlay not thicker than veneer. These need very great accuracy and care in fixing.

It is well to commence with single pieces of wood first, and with straight lines and right angles.

Two or more pieces can also be combined to form a design, and then pieces of wood, other than right-angled pieces, can be used.

After this, irregularly shaped pieces can be used. These require to be cut by a fretsaw.

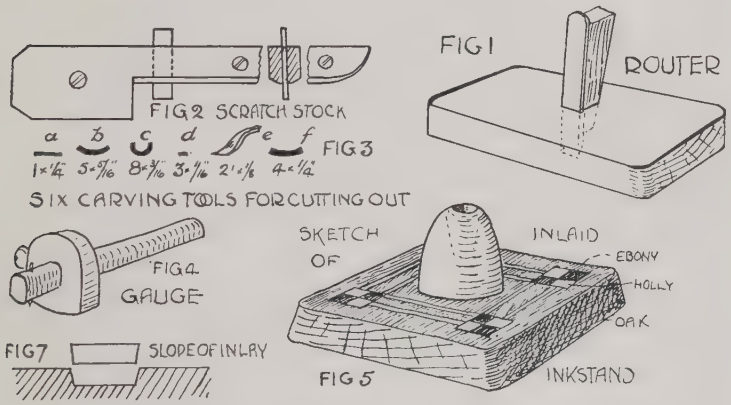
The piece to inlay is finished to its exact outline, and is then laid in place on the wood and its outline very accurately and carefully traced with a scriber. The hole is then cut to a suitable depth, also very carefully and accurately. If the hole is a big one, it is levelled with a "router" (Fig. 1). This ensures a perfectly uniform depth. The inlay is then glued in, pressed home, and kept there, either by means of weights, or a hand screw, or cramp.

Bands and stringing are inlaid into channels that have been cut with a "scratch stock" (Fig. 2).

Designs for inlay can be geometrical or natural, and pictures can, within limits, also be formed of inlay. Natural woods give a fair range of colour, and we have grey wood, mouse wood, hare wood (which is, generally, stained sycamore), to help us in our colour schemes.

But so much good work can be arranged with simple designs and easily cut pieces of wood that, for some time, at least, there is no necessity to undertake the more advanced work.

Inlay forms very suitable decoration for table tops, desk tops, trays, and all kinds of flat horizontal surfaces, as well as for drawer fronts, framing, and panels.



It is not advisable to mix it with carving, as the two forms of decoration are incongruous.

Some shaded effects are obtained by putting the lighter pieces in hot sand and by scorching the edges.

There is a form of inlay which may be done on a school desk, and which does not involve the use of more than two or three carving tools; the inlay material is made of sealing wax, or a composition of which sealing wax is the basis.

The Tools.

If a Handicraft Room is available, then the tools needed for Inlay will be already there, with the possible exception of a "scratch stock."

But it is quite possible that some work will be done without the aid of the equipment we should find in a Handicraft Room.

If the work is attempted on a school desk the board used for wood carving (Figs. 8 and 8*a*, p. 12) will be quite adequate for our need.

About six carving tools of various shapes will be needed (Fig. 3).

A mallet (Fig. 17), page 14.
A gauge (Fig. 4).
A fretsaw.
A glue-pot.
A file.
A smoothing plane.
A dovetail saw.
A router (Fig. 1).
A scratch stock (Fig. 2).
Glass paper.

The Materials.

For the base any straight uniformly-grained piece of wood of good colour will do, such as canary wood, sycamore, lime, beech, mahogany, oak, American walnut, satin walnut, birch.

For the inlay, all the above are suitable, with holly, boxwood, rosewood, ebony, tulip wood, satinwood, kingwood, cherry, and a host of other fancy woods.

For the latter, it is well to apply to a cabinet maker, who has always more short ends and small pieces than he can use in an ordinary way; and a friendly craftsman will provide enough of these to supply a class for a long time.

Pewter and brass are used for inlay, and very often for stringing. Mother of pearl, tortoise shell, and vulcanite are also used.

Strings and bands can be obtained from cabinet makers and dealers in cabinet maker's woods.

Shells, centre pieces, corner pieces, and similar ornaments can also be obtained from the same sources. These are always in veneer thicknesses and need care in laying in.

Glue is necessary; the best is Scotch glue. It should not be muddy but quite clear and bright, and should break with a brittle fracture.

Croid is a good adhesive; it jellies slowly, and can be used cold.

Description of Particular Examples of Inlay.

Two examples will be shown, viz. (*a*) An Inlaid Inkstand (Fig. 5); (*b*) An Inlaid Tie-box (Fig. 6, page 45).

AN INLAID INKSTAND. (Fig. 5.)

It will be assumed that the block of wood is already prepared up to the stage when the inlay is to be done.

The base will be of oak, which will be inlaid with ebony. The work is quite simple, but it contains the essence of inlay.

The stages are as follows—

(1) Prepare the pieces of ebony to the required size. Ebony is a rather brittle wood and needs some care in handling.

The pieces to be obtained are small in size, and are usually well cut with the saw. It is not necessary to plane the surface of the ebony now; this will be done when the work is being cleaned off.

It is well to saw the ebony to nearly the size needed on a saw board, with a fine saw. Expert craftsmen can cut "dead on" the size needed.

Note that the pieces of inlay are bevelled, i.e. the edges slope (Fig. 7), and the pieces are narrower on the lower surface than on the top. They should be cut to about $\frac{1}{8}$ in. thick. Take especial care they are of uniform size and are exactly 90° at each angle.

The bands are done in the same way, i.e. their edges and ends are slightly bevelled, and they are cut to about $\frac{1}{8}$ in. thick and to $\frac{1}{16}$ in. width. A file is useful to deal with ebony, and sets the bevelled edge better than a plane.

(2) Arrange the places for the inlays, and, holding the pieces very firmly, mark carefully round them with a scriber. It will be noticed that it is the lower, and lesser, surface that gets marked upon the wood. The bevel is, of course, only small, and the effect of it is to make it necessary to hammer the pieces into the base. This ensures a tight fit and good joints.

Mark each piece so that it will lie in the same place in which it was marked.

Take the straight carving tool (Fig. 3*a*) and, with the mallet, cut out the wood from the space marked. This is done by placing the chisel across the grain, and making cross cuts close to each other. Do not take the cuts at this stage dead on the outline, but reserve a little space for paring off afterwards.

Take the cuts to a depth that is a little less than the thickness of the piece of inlay. A grounding tool (Fig. 3*e*) will be a very useful tool for this purpose.

When the hole has been taken to this depth, and cut level, then pare carefully the sides to the cut line. Take especial care with the angles.

The incisions for the bands are now to be cut. As they are only $\frac{1}{8}$ in. in width, they should be done with a gauge. The spur of the gauge is cut sharp, and the fence set to the width from the edge of the outside line. It is then taken along the edge of the wood and gradually pressed down to the right depth.

Then the fence is set to the inside line, and taken along the wood similarly. A $\frac{1}{16}$ in. carving tool is now employed to cut this wood out (Fig. 3*d*).

Take great care at the ends of the trenches to get a definite cut at right angles, and with the angles dead sharp.

(3) Heat the glue, and use it hot and thin. Scratch the surface at the bottom of the trenches to afford a key for the glue, and treat similarly the under surface of the inlays.

Glue the holes and press the inlays into them, using a hammer upon a waste piece of wood to force the pieces in. Leave them to set, which will take some hours.

(4) Take a sharp, finely set smoothing plane, and oil its sole with linseed oil. With short circular strokes begin to cut down the small projection of the inlays. Proceed very carefully, and avoid chipping pieces off the inlays at the ends or angles. Then with a

scraper make the surface dead level. When the projections have been removed and a uniformly level surface has been made, take glass paper, about No. S.1, and rub the surface *with the grain*. The glass paper should be wrapped round a cork rubber, or, failing that, round a piece of wood. Then take F.1 glass paper, and, finally, No. O. The surface will be now ready for polishing.

(*b*) An Inlaid Tie-box. (Fig. 6.)

The same processes as in the previous object are followed in exactly the same order, but the inlays being curved in shape as regards the letters are cut with a fretsaw. In the cutting of them, a slight bevel can be given to their edges with the saw, but this can be better done with the file afterwards.

Extreme care is needed to keep the letters in good shape, and it is quite possible that one or more letters may have to be rejected and re-cut. No discouragement should be felt at this.

Very carefully fit and refit the parts, and do nothing hastily. This part of the work is a splendid lesson in the exercise of the virtue of patience.

The wood used may be American walnut for the box, and holly for the inlays, with ebony for the composite corner pieces.

For these corners, the interior edges should be vertical, and only the exterior edges bevelled.

In all other respects follow the instructions given for an inlaid inkstand.

The Further Road.
Bibliography.
The Cost.
} *See* at the end of the chapter.

OVERLAY.

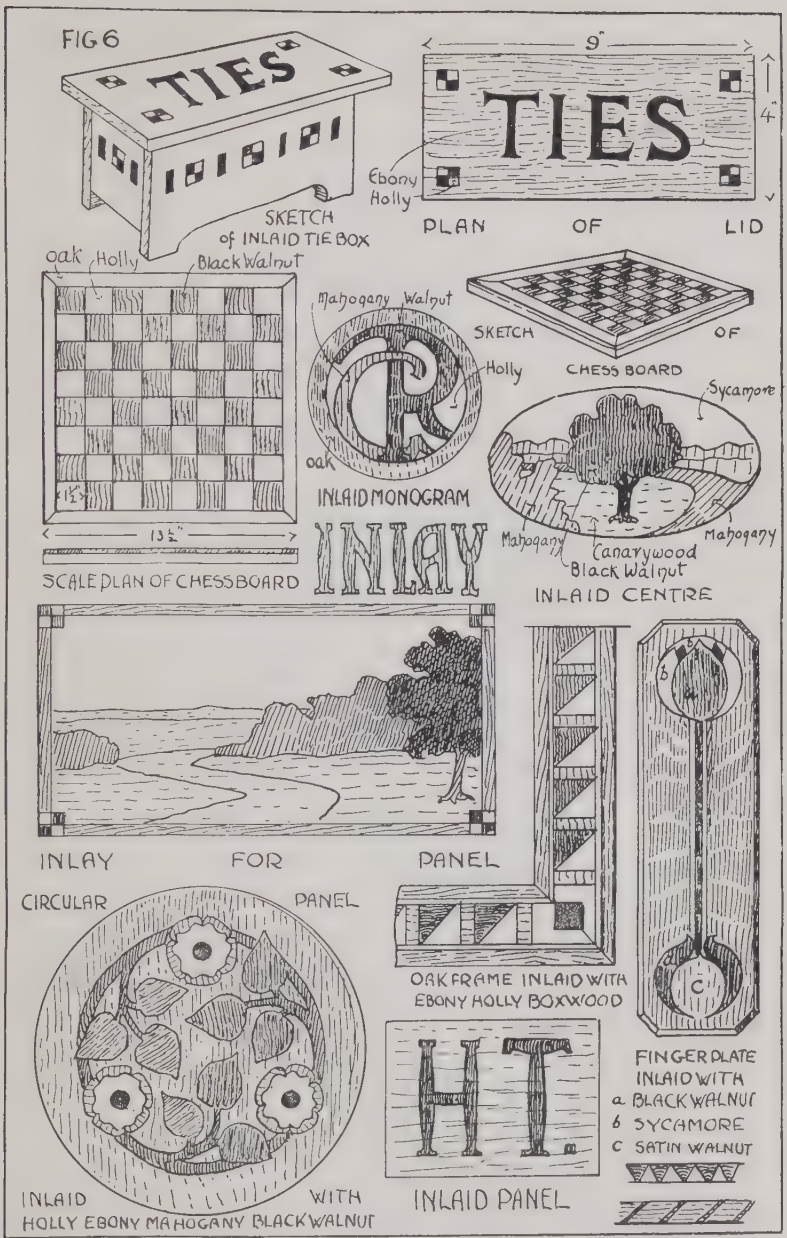
Description.

This work is different from inlay inasmuch as no trenches are cut in the base piece, but the latter, on the contrary, is entirely "overlaid" with the wood that forms the design. The design is entirely made up of smaller pieces glued down to the base. A chess board is a good example of overlay.

In overlay, again, the pieces of wood used are thicker than veneer.

That kind of overlay which is formed of veneer is known as "marqueterie." This scarcely enters into our work. Marqueterie designs are made by special workers who need special apparatus to do them.

Overlay needs a Handicraft Centre for its proper execution. At the same time, some form of overlay can be done on the desk board already mentioned (Fig. 8*a*, p. 12). So much depends upon the worker; a purposeful and intelligent individual will



Designs for Inlay.

not be baulked by the limitations of apparatus from doing what is intended.

The Tools.

The usual tools of a Handicraft Centre.

For what work it is intended shall be done on the desk board, some of the same tools that were used for inlay (p. 41).

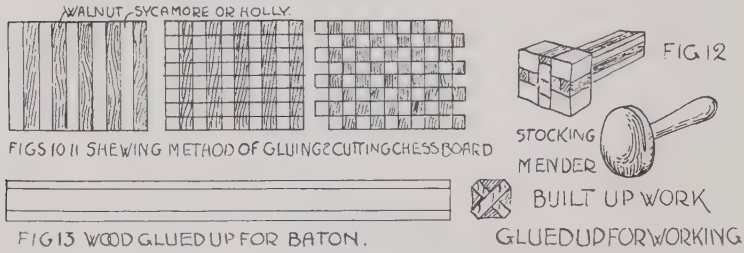
Materials.

The same materials as are mentioned for inlay (p. 42).

Description of a Particular Example of Overlay.

A Chessboard.

(1) The base board for a chessboard should be made of $\frac{1}{2}$ in. canary wood, dry and well seasoned. It is well to batten it. As



a chess square should be $1\frac{1}{4}$ in. as a minimum, the field should be 10 in., and a border of at least $\frac{3}{4}$ in. should be allowed for. This would make the board $11\frac{1}{2}$ in. square, as a minimum.

A large board with $1\frac{3}{4}$ in. or 2 in. squares is a better arrangement, and, considering the work it is proposed to put into it, is recommended.

The surface of the base board should be made perfectly level and true. This is done by careful scraping and glass-papering. It can then be toothed over, so that the very slightly scored surface will afford a key for the glue. A tenon saw may be used to do this, or a bradawl.

(2) To make the squares use American walnut and sycamore. Plane up four strips of each, 12 in. long (the length of nine squares, with allowance for a little waste) by $1\frac{1}{4}$ in. wide by $\frac{3}{16}$ in. thick. Glue these together as in Fig. 10.

When set, plane level and smooth. Then cross cut strips $1\frac{1}{4}$ in. wide. These are now ready for gluing on the base board.

Prepare four border strips of oak or mahogany, 13 in. long by $\frac{3}{4}$ in. wide by $\frac{3}{16}$ in. thick, and four vertical strips 13 in. by $1\frac{3}{8}$ in. by $\frac{3}{16}$ in.

(3) Scratch the under side of the cross-cut strips and the borders. Quickly glue the cross-cut strips down ; note how by having nine squares in each, the black and white can be alternated. Then leave to set.

(4) When set, the edges will be prepared for the border strips. The superfluous squares—16 in number—will be cut off, and the shoulder plane used to make a good surface for the borders. Mitre these border strips at the angles, and glue well down.

Note that all the gluing must be done with the glue hot and thin. Pieces of wood are used to place over the strips when they are cramped down.

To finish, use first a finely set smoothing plane, working with a circular motion, as already described for cleaning off inlay ; then a scraper, and afterwards glass paper. The vertical strips are mitred at the angles and are glued on.

The work is now ready for polishing.

The Further Road.
Bibliography.
The Cost.
See pages 47 and 48.

Other Forms of Glued Art Work.

Description.

By gluing pieces of wood together and afterwards working these by planes, or by a lathe, some interesting results can be obtained.

" Tunbridge Wells " work consists of the formation of pictures by the grouping of sticks of square section in colours to correspond with the colours of the picture. Then cross sections are cut off and used as overlays.

The familiar seaside " rock " is a simple example of this type of work, but done, of course, in sugar.

Stocking menders (Fig. 12), batons (Fig. 13), ninepins, paper knives, and handles are suggested as objects that can be made by this kind of work.

Strips of wood of various colours can be glued together and used to make teapot stands, plant stands, stool tops, trays, calendar backs, boxes, and other similar objects.

The Further Road.

Constant practice is an essential to further progress. Another essential that is not so generally recognized is the ability to design.

In this class of work design is most undoubtedly an indispensable factor, and the student is most earnestly advised to perfect his or her ability in this direction. This is part of the further road, and development along these lines will undoubtedly make for rapid progress.

The development of mechanical skill is a matter of practice and

time; the development of mental and spiritual skill comes also through practice, but is a higher affair and will bring with it greater advantages than the development of any other kind of skill.

Bibliography.

Veneering, Marquetry, and Inlay. P. A. Wells. (P. Marshall.)
Modern Cabinet Work. Wells and Hooper. (Batsford.)

The Cost.

(*a*) *Capital Cost.* It is not very easy to estimate the capital cost, although if the work is to be done entirely on the school desks the cost will not be great.

Probably, for six children doing this work, the capital cost would not exceed £3.

(*b*) *The Annual Cost.* For six children, not more than 30s.

CHAPTER VII.

BOOKBINDING.

Description.

For school purposes, bookbinding commences with such simple work as making a Christmas Card, and goes as far as the binding of a multi-section book in quarter, half, or whole binding; and in paper, cloth boards, or leather.

It also includes designing the covers and the end-papers.

As a rule, the more elaborate and expensive methods of bookbinding, such as designing the cover in gold, are not possible.

Nevertheless, there is enough in the ordinary stages of bookbinding to give satisfactory and absorbing work to students, both children and adults.

If this craft is introduced gradually, children will grow into it in a remarkable manner, and once a few of the pupils thoroughly understand it, and can do it well, it is comparatively easy to carry the work out in an average class.

Commencing with a Christmas Card, the work can go through the processes involved in making the following: a book cover; a simple portfolio; a blotting case; a single section book; a case binding for loose parts; multi-section books in quarter, half, and whole binding, with plain or designed covers, in paper, cloth, or leather.

There will not be space enough to describe in detail the making of all these, but enough will be given to effect a reasonable introduction to the craft, and further instruction will be found in the books mentioned, and in the advice given under the head of "The further road."

Music books often come to pieces; magazines are issued in parts, and need binding or protecting; and the ability to do this is a great asset to the home and to the pocket, apart from the value of bookbinding as an educational practice.

Briefly, the process of bookbinding is this. Books are made up of parts consisting of a certain number of leaves, which are called sections. These sections are sewn to a number (generally three) of either tapes or of cords. These tapes or cords are fixed to cardboard covers, which are covered with cloth, leather, or sometimes paper.

End papers are the papers that are pasted to the insides of the covers. They can be obtained with designs printed in colour on them, or they may be decorated by hand, or they may be stencilled.

Quarter binding consists of covering the "spine" or back with

one material, while the covers are bound with another, generally a cheaper material.

Half binding consists of the above with the addition of corner pieces of the same material as covers the spine.

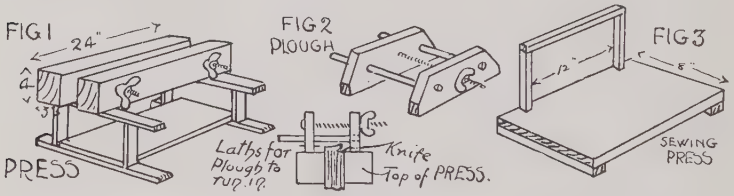
Whole binding is the term used when one entire piece of cloth or leather is used to cover the book, as is the case with this volume.

The edges of books are usually cut, partly to ensure a trim appearance, and partly to save the necessity of cutting between the pages in the case of a new book.

In single section books of small thickness, such as an exercise book, this cutting can be done with a sharp knife and a safety ruler.

For thicker volumes, a plough is used and can be bought or made ; but bookbinders use a guillotine.

Linen covers can be stencilled with oil colours, or they can be embroidered.



Leather covers can be designed and lined out with a hot tool, or while the leather is damp ; and they can also be embossed.

As stencilling and embroidery and leather embossing are described in this book, it will be realized that bookbinding has a value, and a very real and legitimate value, in respect of correlation.

The terms head, tail, front, and back refer to the top edge, bottom edge, front edge, and back edge of a book, respectively.

Tools.

Bookbinding can be carried on with very few tools. A press and a plough are necessary.

The following are the tools needed for twelve students—

Class Set.

One press (Fig. 1).
One plough for use with the press (Fig. 2).
One glue-pot and brush.
Six sewing frames (Fig. 3).
One oilstone.

For Individual Use.

1 knife.
1 pair scissors.
1 bone folder (Fig. 4, page 53).
1 safety ruler.
1 paste brush.
1 wood ruler.
1 zinc plate.
1 set square, 45°.
1 needle.
1 duster.

The press and the plough can be bought from school contractors. The press and plough illustrated at Figs. 1 and 2 are home-made, as are also the sewing frames (Fig. 3). These can be made quite well by children in Handicraft Centres.

The zinc plate is used to cut cardboard on ; its disadvantage is that it blunts the knife, which, as a result, has to be sharpened repeatedly. Strawboard is better, for, although it is used up more quickly, yet it lasts fairly well and saves the knife edge.

The bone folder can be made from an old tooth-brush handle.

The 45° set square is used for getting the angles for the corner pieces used in half binding.

A duster is a very important part of the equipment, as the very first lesson will clearly and unmistakably show.

Materials.

For the Covers. Cardboard, paper, leather, cloth.
For the Backs. Thin card, leather, cloth.
For the Corners. Leather, cloth.
For Joining the Sections. Tape, cord.
Glue for fixing leather and for gluing the back.
Paste to use with cloth and paper.
Strong thread.
For "Guarding" the Sections. Strong, thin, white paper.

Much of this list of materials can be supplied from "waste" materials. Cardboard boxes can be obtained from stationers, boot sellers, confectioners, and drapers.

Wall paper pattern books will supply some end and covering papers.

In boot manufacturing districts, leather scraps can be obtained that will do for corner pieces and backs.

There are many "fixatives" on the market, such as "Stickphast," "Le Page's Glue," "Stickquick," "Higgins' Mountant," "Croid," and "Gloy."

What is needed is an adhesive that will set quickly, and will not eventually dry hard.

Glue is the best of all, but it sets too hard, and, in addition, it needs to be boiled and used when hot.

Bookbinders' paste is made of flour with the addition of alum. (See the books recommended in the Bibliography for recipes.)

Description of Two Particular Examples of Bookbinding.

(*a*) A Portfolio Case for loose parts, half bound in leather (Fig. 5); (*b*) A Multi-section Book, whole bound in cloth (Fig. 6).

A Portfolio Case.

Monthly parts of journals, such as *The Model Engineer*, and parts of large works, like Wells' *History of the World*, that are issued

periodically, are often required for use singly. For this purpose, a portfolio case is what is needed, into which the parts are stored when not in use without being bound into the case.

Proceed by the following stages—

(1) Cut the boards to size. This should allow for $\frac{1}{8}$ in. "square," i.e. projection, at head, tail, and front.

Cut the leather for the back and corners. For the back, it should be the width between boards (which in its turn is found by putting all the parts together lightly and measuring them; no extra allowance need be made), plus an allowance of $1\frac{1}{4}$ in. to go on each cover. If the space between boards has to be 2 in., then the width of the leather back will be 2 in. + $1\frac{1}{4}$ in. + $1\frac{1}{4}$ in. = $4\frac{1}{2}$ in. Its length will be the length of the board, plus $\frac{3}{4}$ in. at each end.

Cut the corner pieces. If the corner pieces are to measure $1\frac{1}{2}$ in. along each edge of the cover, as in Fig. 5, then the setting out will be as in Fig. 7. The best way to cut these out is to make a cardboard template to the shape *ABCD* (Fig. 7). Then cut a strip of leather the width of *OP*, and one corner piece can then be cut out of another (Fig. 8). Bookbinders have templates of all sizes to fit all sizes of books; but the angle is always 45°.

Cut a piece of linen or other strong material of the same size as the leather back, and then a piece of bookbinder's cloth of the same size. These are to be pasted or glued inside to strengthen the back, and to make it neat and presentable. (*See* section in Fig. 5.)

The cloth for the covers has to be cut out yet, and also the lining papers, but these can be cut at a later stage; see that they are there, however, and also the tape (about half a yard) that is needed to tie the portfolio up.

(2) Take the two covers (boards, as they are called) and glue to them the four corner pieces. It will be found that when these are folded over, a perfect mitre joint will be formed (Fig. 9). See that the extreme corners of the boards are covered.

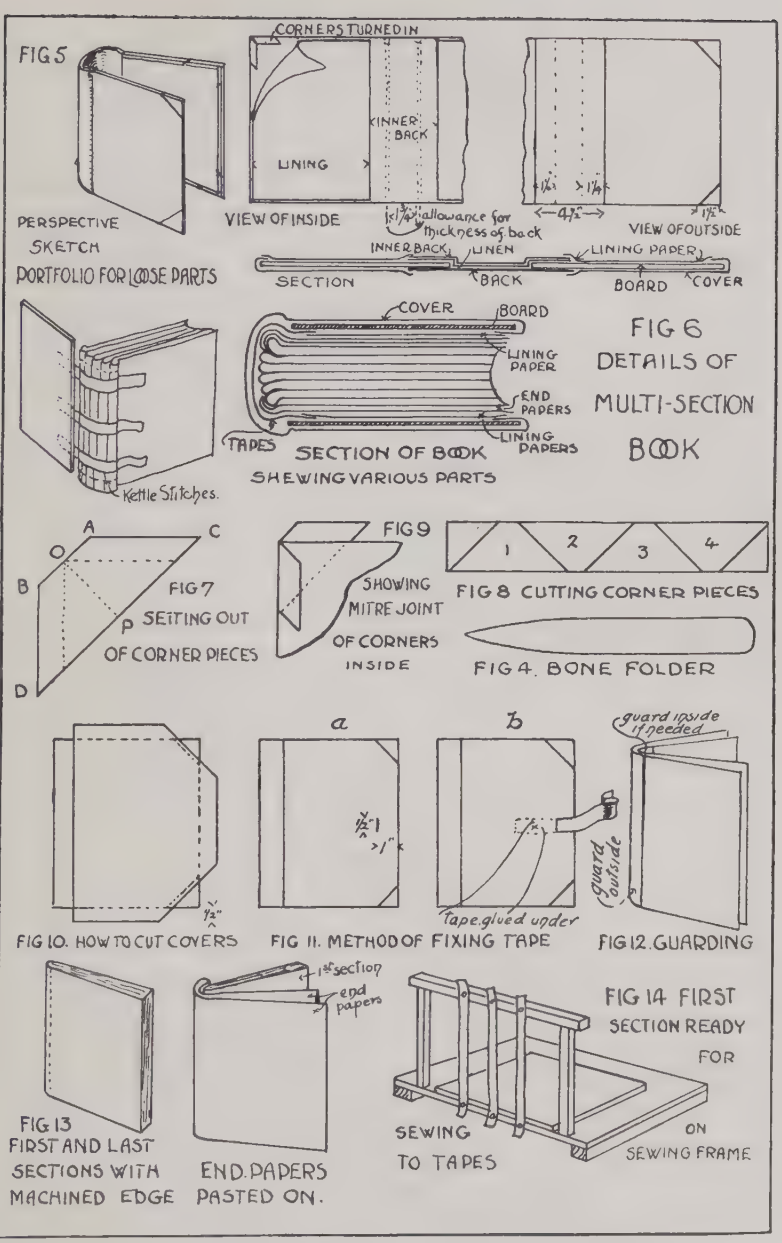
Then take the leather back and mark the exact width between the boards when the folio is closed, plus the thickness of the two boards. (*See* Fig. 5.)

Now glue the boards just up to these lines, and fold over the margin at the head and tail; press well down.

Next glue down, on the inside, the linen fabric, and cover this again with the bookbinder's cloth that has already been cut out.

In gluing these down use the fingers or the duster with great pressure, and keep on pressing and coaxing the materials to stay down until the whole is well set. This is to avoid air bubbles and loose edges.

(3) The next step is to lay the covers on to the boards. Fig. 10 shows how this is done. Place the back edge just overlapping the leather back, and cut the cover so that it just overlaps the corner pieces, and will fold over the head, tail, and front by about $\frac{1}{2}$ in.



Bookbinding Details.

Glue these on and press out air bubbles and wrinkles.

(4) The next step is to insert the tape. In this case, only one piece (for the front edge) is used. In large folios one is also fixed to the head and one to the tail.

A cut is made in the place shown in Fig. 11*a*. A $\frac{1}{2}$ in. chisel is the best tool to use, although a knife will make the cut adequately.

Pass the tape through and glue about 2 in. of it to the inside of the cover (Fig. 11*b*). Now paste the lining papers inside and bring them up to $\frac{1}{16}$ in. of the edge, and take care they are parallel.

The portfolio is now complete.

A Multi-section Book, Whole Bound in Cloth.

Any publication issued in parts, or music that needs binding, will do.

Proceed by the following stages—

(1) Remove the paper bindings and advertisements and separate the sections. If these sections are wire bound take out the wire, and if they are sewn take out the thread. Keep them in consecutive order. Very often these sections are torn at the back. If so, they will need "guarding." This consists of pasting a narrow strip of strong white thin paper up the back edge. Sometimes a strip is also needed up the inside (Fig. 12).

The first and last sections should be sewn the whole length (Fig. 13). A sewing machine is best for this. This prevents the early tearing away of these sections, and strengthens the book enormously.

After this sewing has been done, paste on the end papers. Fig. 13, which gives a sketch of the first section, shows how this is done. There are other methods of fixing end papers, but this is quite a satisfactory one.

(2) We are now ready to sew the sections to the tapes.

The "sewing boards" (Fig. 3) are of the home-made type, but are really very useful. The orthodox boards or frames have, as uprights, wood screws with nuts, which will tighten the tapes and cords.

Pin the tapes (we will suppose there are three) to the top bar and to the under surface of the board with drawing pins (Fig. 14).

Put all the sections together, flush on all edges, and fix in the press, with the back edge upwards and projecting out of the press by $\frac{1}{8}$ in. With a fine dovetail saw, make incisions along the lines as shown in Fig. 15 about $\frac{1}{16}$ in. deep. The two outside lines are for the *kettle-stitches*; incisions are made also on each side of the tapes.

Lay the first section on the board, face downwards. (*Special Note.* Some binders sew the end papers in, and the front end papers would in this case be the first section.) From the outside, pass the needle through the bottom kettle-stitch, take it along the

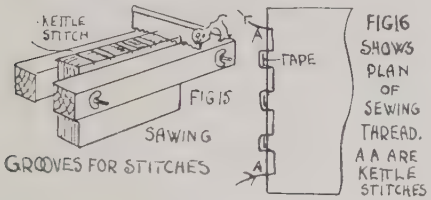
inside, and out at the hole on the lower edge of the bottom tape, round the outside of the tape, in at the next hole, and so on until the needle comes out at the top kettle-stitch hole (Fig. 16).

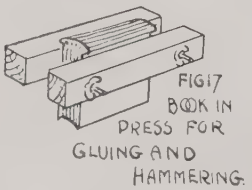
Now lay on the second section, and pass the needle through the top kettle-stitch hole and out at the top edge of the top tape, and so on downwards until it appears coming out of the lower kettle-stitch hole. Fix it to the tag end of the thread that was left at the lower hole of the first section.

Lay on the third section and take the thread and pass it through the lower kettle-stitch hole and proceed with all the sections similarly. Always fasten the kettle-stitches to each other.

(3) Cut off the tapes, leaving about 2 in. over at each side.

The back now should be rounded and glued.





Form the rounded back with the fingers, and keep the head and tail perfectly flush.

Put the book in the press, between two boards and pretty low down, as in Fig. 17.

Glue the back with hot thin glue, and press it well in. When it is "tacky," take a wide, flat-faced hammer, and beat the back well, directing the blows sideways so that the back is laid well over the edges of the boards. (These are not the boards that are to be fixed on the book.) This forms the "hinge."

When dry, take out of the press.

The next step is to cut the edges, if they need cutting. For this purpose, the book is pressed flat by beating and put in the press with its front edge projecting above the jaws by the distance necessary. The plough is then used to cut off the superfluous edge. Proceed similarly with the head and the tail.

(4) Cut the boards for the book. Allow for the "square," i.e. the projection at head, tail, and front. Keep each board about $\frac{1}{8}$ in. away from the knocked up "joint." This allows for easy movement of the boards in opening.

Cut the leather back, corner pieces, and covers as described in the first example.

Glue the tapes to the boards; glue the corners and back; glue or paste the covers to the boards, and paste the end papers to the inside of the back.

The book is now complete.

The Further Road.

There is nothing like actual practice, carried on continuously. "Learn by Doing" is a slogan that is altogether true. Many situations in craft work arise with which no description in writing can deal. The solution to many craft problems can come only with actually doing the job. Experiment with materials and methods. Don't hesitate to be unorthodox if you think a desired result will follow better along those lines. Get hold of the books mentioned in the Bibliography, and get all the help you can from friendly craftsmen.

Bibliography.

Bookbinding. Douglas Cockerell. (Pitman.)
Bookbinding as a Handwork Subject. J. Halliday. (Pitman.)

Cost.

(*a*) *Capital Cost.* For twelve pupils, the cost would be about £6 10s., but if the press and plough and sewing frames were made in the Handicraft Room not more than about £3 10s.

(*b*) *Annual Cost.* For twelve pupils, about £4 10s., and, as bookbinding is a craft in which students are anxious to pay for work done, this cost can be reduced to a very low figure. Also, as waste materials can play a great part, this will also materially reduce the cost.

CHAPTER VIII.

BENT IRON WORK.

Description.

Bent iron work is really only part of a craft, that of metal work. It is, however, a form of metal work that is very useful for school work, and can be easily practised on a school desk, if there is also a bench or table with a parallel vice, and provision for drilling and riveting. The ideal room is, of course, one that is fitted for general school handwork, and has tables and a bench or two.

There was a type of bent iron work that was common enough twenty years ago and more, in which soft iron strips were used, clipped together with clips made of the same material. But we can now go further than this, and bring in the use of drills, rivets, nuts and bolts, and brazing or soldering.

There is a material known as Ribbon Iron that is obtainable in narrow widths, from $\frac{1}{8}$ in. upwards, and this can be used for our purpose. Copper and brass strips can also be used.

The objects that can be made are suggested below—

Foundations for lamp shades, shelf brackets, photo frames, inkstands, jam pot holders, flower stands, candlesticks, hall lanterns, scissors racks, table lamps, electric light holders, and similar objects.

For finishing the work, Berlin black and gold, or other metallic paints, can be used; or the object can be heated and then oiled with raw linseed oil.

The Tools.

For Class Use.

1 parallel vice.
1 hand drill with drill points up to $\frac{1}{8}$".
1 metal block or small anvil.
1 copper bit.
A few files.
3 $\frac{3}{4}$lb. engineer's hammers.

For Individual Use.

1 pair of square-nose pliers } between two.
1 pair of round-nose pliers }

In this craft there is ample opportunity for the creation of home-made tools to meet the special difficulties that occur from time to time. For bending the metal to certain special shapes, this need will be found very evident.

5—(1102)

The Materials.

Ribbon metal, No. 23 gauge, rivets, ball-headed and other bolts and nuts, solder, fine wire for temporary binding, Berlin black, metallic paints, and raw linseed oil for finishing. Some stiff wire, about No. 14 gauge, and some $\frac{3}{16}$ in. round and square iron bar is of use to stiffen the work. Copper and brass strip also may be used if needed.

Description of a Particular Example.

A Flower Vase. (Fig. 1.)

Proceed by the following stages—

(1) Prepare a working drawing (Fig. 2), which will give all true shapes and sizes, to a full size scale.

Then bend off, with the square-nosed pliers, the ribbon metal to the exact lengths needed, and file the ends smooth. Mark the centres for drilling the holes and drill them. The centres should be dotted with a centre punch, or a wire nail, to ensure the drill point remaining in the centre.

(2) Bend the parts to the shapes needed. This is done with the round and square-nosed pliers, or with any special tool that has been invented for the purpose. Be very exact.

Note that the top of the legs must not be bent over until the riveting has been done.

(3) Rivet the parts together. Commence with the central and smaller ring, which is in three parts. Then rivet the lower ring, which is also in three parts, and the upper outer ring, which is in one piece, and is riveted to the projections of the inner ring. Then rivet the legs to the upper and lower rings.

In riveting, the aim is to get a nicely rounded end, which is accomplished by using the ball pane of the hammer with an outwardly directed stroke.

The glass vase rests with its edge upon the inner top circle.

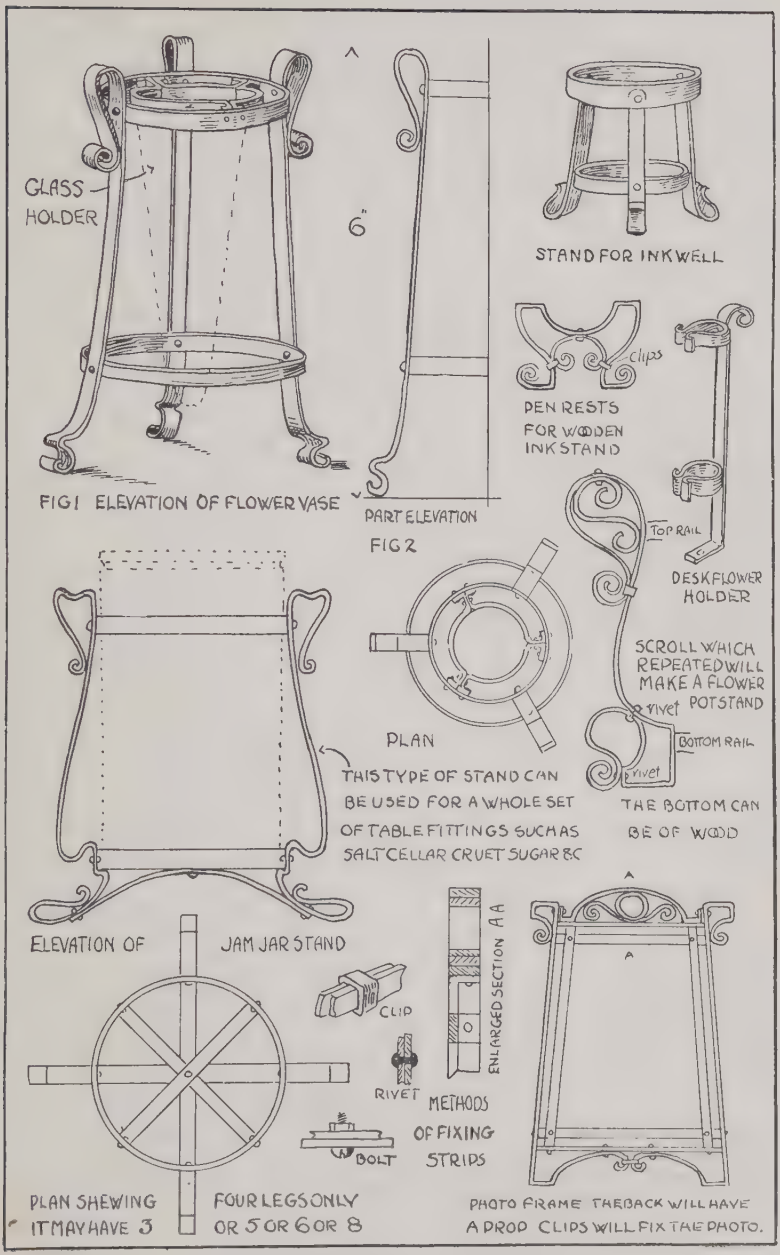
(4) Finish with Berlin black, which gives a dead black finish ; or one of the metallic paints ; or heat the whole stand in a gas ring, and paint with raw linseed oil.

The Further Road.

Pursue the study of design, and apply it particularly to the question of curves that can be done in metal, and by metal work tools. This is important, as bent iron work is a craft where outline and shape of curve are most insistent.

Then, on the mechanical side, practise and experiment continually.

Do not be satisfied with descriptions of work done by any other craftsman ; try your own solutions and ideas. At the same time



Designs for Bent Iron Work.

study good examples of both old and new iron work of larger type, such as gates, screens, and grills.

Bibliography.

Bent Ironwork. (Cassells.)
Metal Work. (C. G. Leland.) (Pitman.)

The Cost.

(*a*) *Capital Cost* for six students, about £2.
(*b*) *Annual Cost* for six students, about 8s.

CHAPTER IX.

COLOURED, OR STAINED, WOODWORK.

Description.

Colour is not used in our craft work as much as it might be. Yet how one single note of brilliant colour relieves the monotony of an average room! It is, indeed, surprising that we have neglected colour in the Handicraft Room, when we remember how passionately a child will riot with colour. Children probably appreciate colour before light and shade, and certainly before form.

The application of stain to wood, as described here, is a serious attempt to show how we bring colour to help us in our craft work in wood.

The author has had some very striking successes in this form of work; the children are fascinated by it; and one can get better results in the finish of the woodwork when the child knows that a smooth, well-finished surface is absolutely essential to put the colour on.

Very little technique is needed, only some quite simple knowledge of design and care in laying the colours on.

All the woodwork that is to be stained can be made in a Handicraft Room, or in the Practical Instruction Room of the school. All the staining and polishing can quite well be done on the school desk, on the desk board shown on page 12 (Fig. 8*a*).

The operations are as follows. First, the article to be stained is made, and the surfaces are well planed, scraped, and glass papered. The objects are then glue-sized, to prevent the running of the colours, although hard, close-grained woods like sycamore and beech need not be so sized.

The designs are then drawn or traced on, and the stains are washed in.

It is, of course, assumed that the drawing and design have been worked out previously. When the stains have been applied, the edges of the colour patches are lined in with Indian ink. Then the colour is fixed, and the work is done.

The Tools.

A few paint brushes, a polish brush, a clean cloth, a mapping pen, and glass paper of fine grade.

The Materials.

Stains of various kinds; French polish, or wax polish, or furniture cream, or raw linseed oil, and Indian ink.

Water stains are good and cheap. It is possible to get all kinds of stains to imitate wood, such as oak, walnut, mahogany, ebony ; but often we want a bright yellow, purple, or blue, and it is not so easy to get these. Substitutes for them are waterproof inks and good water colours. Water colours are not so strong as stains, and therefore not so permanent, but still they are useful.

Stains can be had ready mixed, good ones being Palmer's, Stephen's, Johnson's, Lindsay's, and Marquo stains. These can be had at artists' stores and often at chemists.

It is advisable to prepare one's own stains on the score of economy. Messrs. Manders, of Wolverhampton, the wholesale colour manufacturers, make, in powder form, stains that need stirring in boiling water, suitable for oak, walnut, ebony, greenheart, mahogany, and satinwood, and these are exceptionally good. Painters' supply stores are the best for these stains.

For brilliant colours especially, such as greens, blues, purples, yellows, scarlets, as well as the usual more sober shades, aniline stains or dyes are very suitable. Messrs. A. W. Brook & Co., of Charles Street, Leicester, can be written to in respect of these. The author has had some successful results with this class of stain. They are in powder form and are soluble in water.

French polish consists of lac dissolved in methylated spirits. It can be had in many shades, but brown is generally the most useful colour, while for white woods white polish is the best.

Description of a Particular Example.

A Pipe-Rack. (Fig. 1.)

It is assumed that the design has been prepared, and the pipe-rack actually made. It is better to have these articles fully finished in respect of the woodwork.

The following are the steps—

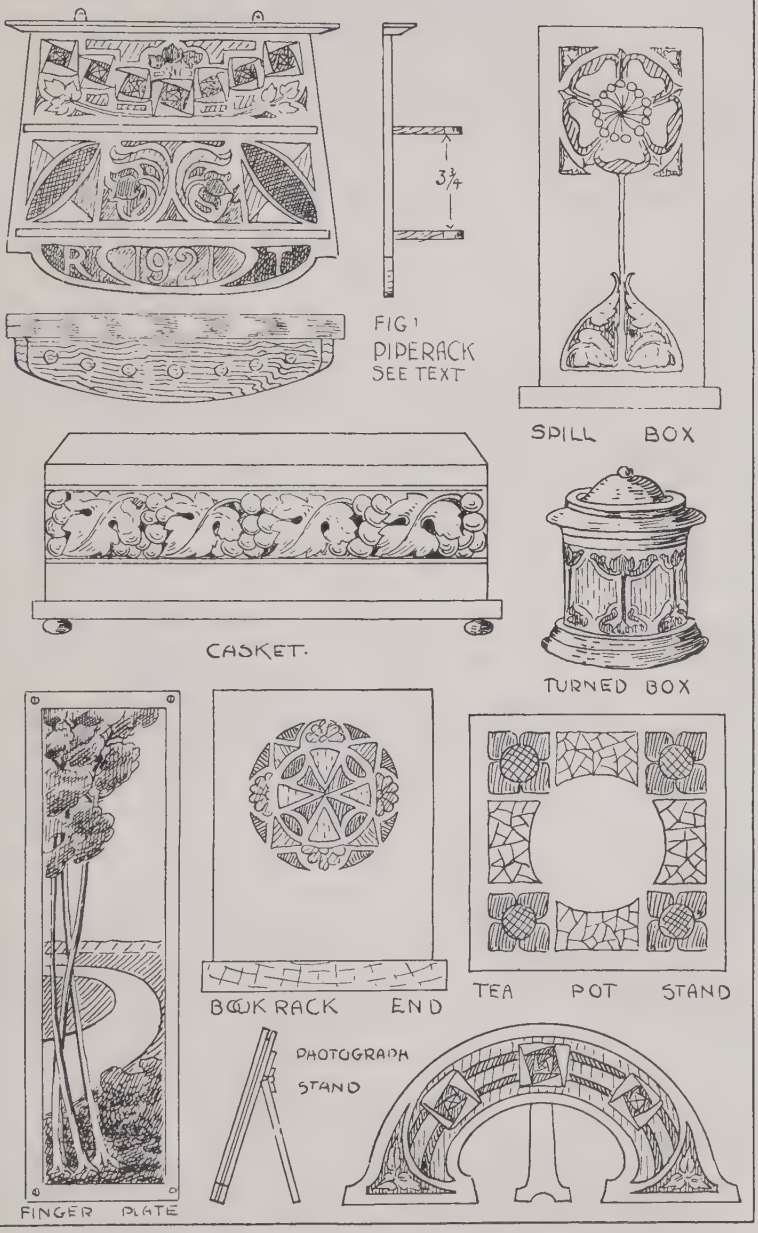
(1) Glue-size the wood all over. When dry, glass paper with Fine No. 1, or No. O glass paper. Then trace or draw the design on the wood.

(2) Wash in the colours.

(3) Line the outlines with Indian ink.

(4) Polish or otherwise fix the colours.

If French polish is used it is put on as follows : With a camel-hair mop, put on two coats of polish. Then " cut down " by rubbing the surface, with the grain, with No. O glass paper ; rub lightly. Then with a rubber, which consists of a cotton wool pad covered with linen or cotton, rub the polish over the surface with a circular motion until a good body of polish has been put on. Again, when dry, " cut down " as before. Give another good coat of polish with the rubber, when enough should now be on to give a sufficient finish. Sometimes, after the coats of brush polish



DESIGNS FOR STAINED WOOD WORK.

have been put on and the work is "cut down," furniture cream or raw linseed oil is rubbed on, and a dull finish is formed.

No other work need be done at the object. It will be seen how simple this is; and yet it is effective, not only as regards the material result, but as regards the development that takes place in the child.

The very large number of simple designs that lie within the possibilities of the child is very great, and the keen interest taken in the work causes increased interest in the drawing lessons, and reacts very favourably on the work of the whole school.

The Further Road.

Only one example has been given, and that is an example of multiple colouring. But wood can be stained with a single colour to look exceedingly well. Experiment in mixing stains to get effects that are not usual but are good. It will be seen how in all this art craft work the exceedingly great importance of design is emphasized. This being so, work at art as for very life. My feeling about it is that art exercises a greater humanizing and a greater developmental effect on character than any other school study.

Pictures may be drawn and coloured; and this opens up a field for the establishment of a sketching club, and the possibilities of application of the sketches to definite material objects.

There has been a cult called "Marqueterie Staining," which originally copied, in close imitation, real marquetry designs. Avoid this at all costs. Let the staining be real staining, frankly expressed, and not any imitation of any real thing. Let the staining be the real craft.

Continual personal practice is all that can be recommended after this.

Bibliography.

There are no books specially dealing with this section of craft. General art reading is what is recommended, with special reference to design and colour. For general wood staining and polishing—

Staining and Polishing. (Evans Bros.)

Wood Finishing. (Cassells.)

The Cost.

(*a*) *Capital Cost.* None.

(*b*) *Annual Cost.* For twelve students the cost would be about £2 including cost of wood. If a charge is made, as it reasonably could be, then the cost is reduced to practically nil.

This is one of the least expensive forms of craft work, and at the same time one of the most pleasing and satisfying.

CHAPTER X.

STENCIL CUTTING.

Description.

Designs and pictures can be reproduced repeatedly by means of stencil plates until the plate breaks or becomes otherwise unfit for use. The designs and pictures are drawn out, and then cut into parts that are separated by thin strips known as bridges; these bridges hold together the edges of the cut plate. When a brush containing colour is "dabbed" on the plate, it is obvious that the cut out parts allow the colour to get on to the paper below, while the bridges prevent this and appear as white streaks.

Plates can be cut for designs in one, two, or more colours.

In addition to designs, figures, names, and trade marks can be reproduced by means of stencil plates.

The Tools.

(1) *A Stencil Knife.* The cardboard knife, if kept well sharpened, will do for most work; but for very fine angles a thin-bladed knife is necessary. A fine pen-knife will do.

(2) *Cutting Pads.* These may be of plate glass, zinc, slate, hardwood, millboard.

(3) *Brushes.* Stencil brushes (Fig. 1). These can be had in many sizes; No. 0 and No. 3 are the most suitable. Hog's-hair brushes will do if it is not desired to buy stencil brushes.

The Materials.

To make the stencil plates, strong cartridge paper is made waterproof with French polish, or knotting; the latter is used by painters to put on the knots before painting woodwork, so that the knots will not "bleed."

Oiled paper specially prepared for stencilling can be obtained from artists' dealers.

Colours are either water colour or oil colour For water colour stencilling the colours in pans are the best. For oil colour stencilling the colours are in tubes in 15 colours, specially prepared.

The colours used for French pen painting are very good, as they have no excess of oil and dry quickly and hard.

The ordinary school oil colour can be used also.

For large surfaces, such as friezes, distemper is used.

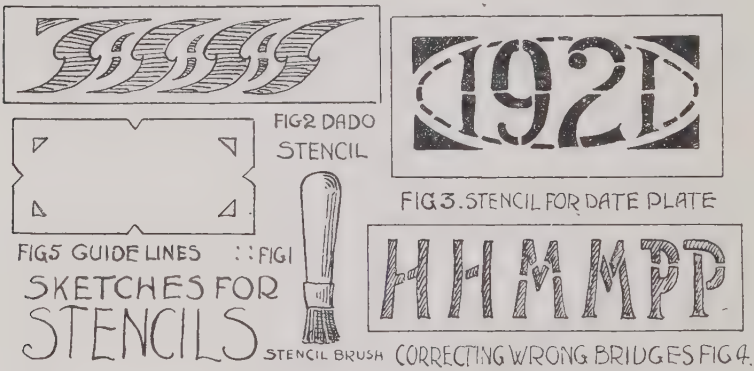
Description of Some Particular Examples of Stencil Cutting.

(*a*) A Design for a Dado (Fig. 2); (*b*) A Design for a Date-plate (Fig. 3).

In making designs, one great difficulty consists in getting the bridges in the right place. There should never be external angles, as these tend to turn up, and colour gets below. Fig. 4 shows an incorrectly arranged plate and how to rectify it. The same directions will do for both designs.

(1) With a sharp pencil, draw or trace the design very accurately on the plate.

Then lay the cartridge paper upon the glass, or cardboard, or other cutting block. Take the knife and, holding it as you would a pencil, commence to cut the waste pieces out. Begin at an angle, and always work away from it. See that the knife gets



through the paper from the very commencement ; it is indispensable that the cuts shall be clean, and the angles clear of ragged edges. There should be no " pull " on the knife. Give as much support to the bridges as you can with the fingers, or with a ruler. All edges should be continuous.

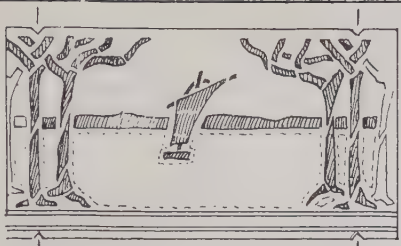
It will be found that the knife gets blunt, especially if zinc plates and glass slabs are used. This is why cardboard pads are recommended. The knife should be sharpened frequently.

There is no special ability needed to make these cuts ; but there is need for extreme care and close concentration.

The importance of cutting away from the angles is seen clearly when cutting the angles that are contiguous to the bridges, because they are so narrow that the slightest overcut renders them useless. If they have been cut across, a piece of stamp paper, or other gummed paper, should be put on, and the bridge re-cut.

If the stencil plate is thin, it can be cut through at the first stroke ; but if it is thick, it has to be scored first and then cut through.

(2) The cartridge paper will need stiffening. This is done with



DESIGN FOR FRIEZE THERE WILL BE ANOTHER PLATE CUT FOR THE SEA ONLY ON DOTTED LINE

FILLING FOR WALLSPACE

SUGGESTION - FOR A BORDER

DESIGN FOR A

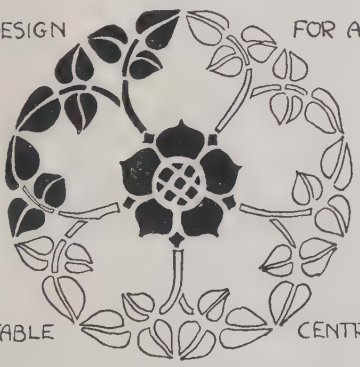
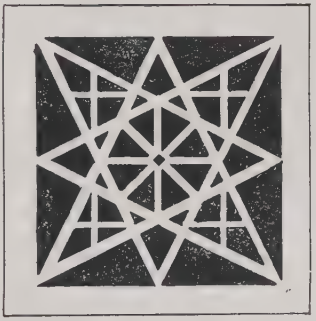


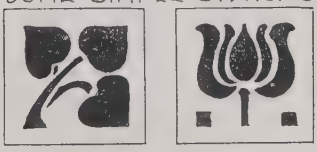
TABLE CENTRE

DESIGN FOR BOOK END PAPERS



GEOMETRICAL STENCIL DESIGN

SOME SIMPLE STENCILS



Designs for Stencilling.

French polish, or knotting, which gets into the pores of the paper and renders it waterproof and stiff.

(3) When the polish becomes dry, which takes perhaps half an hour, we are ready to use the stencil plate.

(a) Water Colours.

Use a minimum of water and have the colours used as dry as possible. The best way to do this is to have thick blotting paper, or felt, soaked in water ; then dip the stencil brush on that and rub it on the colour in the pan. Apply it to the work by dabbing it gently but quickly. Do not use the brush with a horizontal stroke, or even an oblique one, but always vertically, and " dab ' it.

The colour can be varied in its application. Thus, a leaf can have its centre strong, but its edges lighter.

It will be understood that wet colour runs under the edges of the plate and smudges.

If tube colours are used, spread them out on a palette, so that the brush does not pick up too much.

It is well to use one brush for each tint, as far as it is possible to do so.

(b) Oil Colours.

As a rule, oil colour is used for woven fabrics, such as table centres, curtains, panels, and sideboard covers.

There is not so much danger of smudging in using oil colour as in water colour, because more colour can be taken up on the brush, without danger of its running and spreading.

Still, care must be taken that the colour is not too thin, else it will run and the oil will spread and make a discoloured patch. To prevent any possibility of this, place blotting paper under the fabric so that any excess of oil will be absorbed.

Guide Lines and Multi-colour Stencil Plates.

In the case of stencils with two and more colours, it is possible, with care, to use one stencil plate only, using the colours on it at one sitting. But it is better to have as many plates as you have colours. There is no difficulty in doing this, provided means are taken to keep all the plates absolutely co-incident.

This is done by having pieces cut out of each plate exactly in the same relative positions, so that they can be accurately placed on the work (Fig. 5). To cut the stencil plates for multi-colours, decide where each colour is to be, and make one plate for each colour only.

The Further Road.

Again comes the necessity for pursuing the study of drawing and design. All the mechanical skill in the world cannot wipe out the effect of a bad design. Then constant practice keeps the

hand skill alive. If you know a friendly painter, he will be able to give you many hints on the use and practice of stencil-craft.

Bibliography.

Stencil Craft. H. Cadness. (Pitman.)
Simple Art Applied to Handwork. H. A. Rankin. (Pitman.)

The Cost.

(*a*) *Capital Cost.* For twelve students, £2 10s.
(*b*) *Annual Cost,* about £1.

If cardboard modelling is taken in the school, the capital cost will be much less, because the tools used will be the same, except as regards the brushes.

CHAPTER XI.

BASKETRY.

This falls under two main heads: (*a*) Indian Basketry, and (*b*) Willow Basketry.

INDIAN BASKETRY.

Description.

This is one of the oldest forms of craft known to the world, and it has been brought to varying degrees of perfection by different peoples whose history stretches far back into remote antiquity. It is generally supposed that North American Indians produced some of the most beautiful basketry, and have given the largest and most interesting variety of stitches, while they are rivalled by the Japanese and Siamese workers in point of the durability and perfection of their work.

The variety of uses to which baskets were put by the natives is amazing. Baskets for storage, for jewels, for the papoose cradle, food plates, carrier baskets, hats, capes, sandals, and a wonderful variety of articles arising out of household and personal needs.

The designs have a wonderful meaning to the student. It is as if inspiration came from passing events, from hopes and fears, or from creature movement, and are representative of the feelings of the workers, who were chiefly women.

Indian Basketry has been, and can be, done in many materials. Rushes, dried grasses, osiers, cane, and raffia are all used. Basketry may be the simple weaving of cane or other materials, or it can be made in coils (as in Indian Basketry) and wrapped round and round with raffia or dried grasses. The materials that are the most in use in schools are cane and raffia. The materials are soft and pliable singly, and are not, therefore, difficult to work; but when united they are strong and almost unbreakable. These qualities make it possible to use them for so many varying and useful purposes, even in our present stage of civilization, that no necessity exists for going outside the limits of useful articles. Indeed, this should be taken as a standing general principle in all our work, that no article made should be useless, however beautiful it may be.

Indian Basketry is done by coiling. It consists of using either cane, or a strand made of several strings of raffia put together, as foundations, and working them into a coil; and while the coil is forming it is wrapped round with raffia, and each successive layer of the coil is attached to the previous layer by means of stitches of

various kinds, which, while holding the coil together, at the same time allow designs to be worked into the fabric.

It is in the mastering of the start in making the coil, and in making the stitches, that the greatest difficulties occur, and, because of this, the description of actual examples of work will be devoted, principally, to these operations; special reference is also made to other operations, such as joining stitch and foundation. After a start has been made, the work resolves itself into repetition, with the necessary care and judgment in making the design by means of the stitches, and in shaping the basket so that it serves the most useful purpose, and is, at the same time, giving the greatest beauty of curve in its shape.

The Tools.

The tools necessary are few and simple, being merely a pair of scissors and a tapestry or rug needle. Abel Morrall's tapestry needles, No. 18, are usually considered by workers to be the best.

The Materials.

These, too, are of the same simple order.

For foundations of the coil, raffia, rushes, dried grasses, willow, and cane are all suitable. The cane we use is often known as pulp cane, and it is cut by machines from the pulp of the rattan cane, which grows in India, Ceylon, China, and the Malay Peninsula. It is sold in sizes from 0 to 12. No. 6 is the best for Indian Basketry.

For the sewing thread, raffia is the most suitable. It can be obtained in natural and in coloured shades. Get the best, and see that it is raffia and not bast. The coloured is always good.

Dyeing Raffia. You can dye your own raffia, and it is desirable to experiment with berries, beetroot, tea leaves, and coffee grounds, Drummer and Maypole and Nadco dyes. A solution of alum and water will fix the dye.

Description of Particular Examples of Indian Basketry.

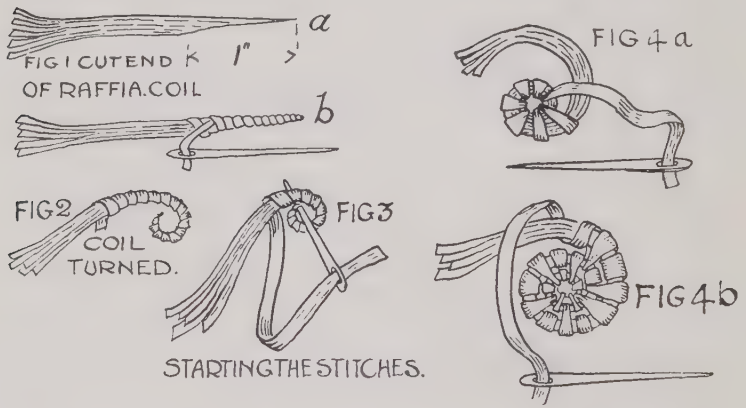
There are two kinds of coil in Indian Basketry: (*a*) the soft coil, made of soft grasses or raffia; and (*b*) the hard coil, made of cane.

(*a*) *The Soft Coil.* (1) Starting; (2) Joining; (3) Replenishing Coil; (4) Finishing.

Making the Coil. Take a bunch of raffia threads of any suitable thickness. Clip the end as in Fig. 1 to about 1 in. Take the sewing thread, lay it along this inch, and, beginning at the end, bind the clipped end. Turn this end upon itself as in Fig 2, making the smallest disc you can, and secure by a stitch taken completely round and under, but not through, the coil. Keep the bunch of raffia that forms the foundation to the left, and work round and round, sewing *over* the topmost coil, and each time passing the

needle through the top strand of the lower coil, thus connecting the rows securely (Fig. 3). As the work proceeds, twist the coil with a *downward* twist by the left hand, in which it is held. In the first round put as many stitches as you can get, or wide spaces will appear in subsequent rows. In the second round, place the stitches exactly between, or immediately to the left, of those in the first round, and follow this rule right through (Fig. 4).

The Join (Fig. 5). Pull the last stitch quite firmly. Leave about an inch of raffia, place it from right to left, and let it lie hidden beneath the strands forming the coil. Similarly, hide about an inch of the new thread, see that the coil is smooth and even, and go on working. No knots should be used.



Replenishing the Coil. It is very important that strands of uneven length should form the coil, so that new strands are needed at intervals and not all at once. When the need arises, a new strand is tucked into the coil and the end is hidden by the firm twist.

Hints on Working. If two or more colours are to be worked, just so many needles will be required, and the coloured threads are carried on, hidden beneath the coil until they are wanted.

Let all coiling come naturally, and do not drag the foundation or it will cause the mat to twist. In raising edges, lift the coil a little, and keep lifting until a definite edge has been raised. For a basket with upright sides, the raising should be done in 3 in. of length, otherwise the sides will slope.

The side of the work that is to be seen ultimately should be made to face the worker, so that due care can be taken in keeping the stitches whole and the design in place.

Finishing the Coil. Pare down the end of the coil about an inch from the under side, and go on with the sewing, when the coil will gradually disappear and be sewn in ; run the sewing thread back

from left to right, hidden in the coil, for about an inch. Pull firmly and cut the end neatly.

The Cane Foundation.

The Start. Soak the cane well for twelve hours previously, or it will break as you coil it. Keep the cane coiled round the left arm,

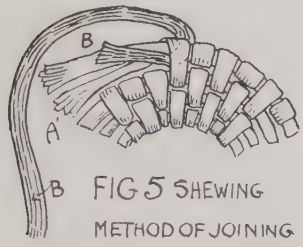


FIG 5 SHEWING METHOD OF JOINING NEW AND OLD STRANDS A. OLD STRAND B. NEW STRAND

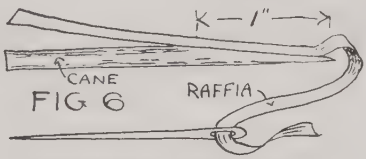


FIG 6 COMMENCING CANE COIL

FIG 7 RAFFIA WOUND ROUND

FIG 9 JOINING NEW CANE TO EXISTING CANE

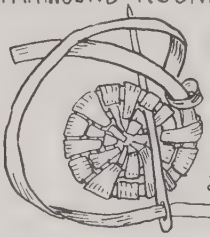


FIG 8 LAZY SQUAW STITCH

FIG 10 WEST AFRICAN STITCH

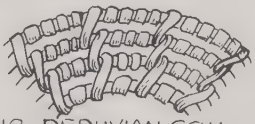


FIG 12 PERUVIAN COIL

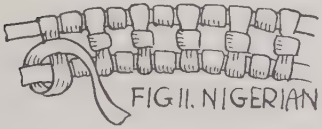


FIG 11. NIGERIAN

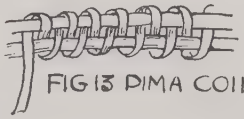


FIG 13 PIMA COIL

like a bracelet, leaving just sufficient free for working. Pare the end of the cane to a point, from about $1\frac{1}{2}$ in. to 2 in. up (Fig. 6). Pass this quickly over a pencil to make it easy to curve.

Thread a tapestry needle with raffia of medium width, and lay the unthreaded end (that farthest from the needle) along the prepared cane for about an inch, holding the pared side uppermost. Holding this end firmly down with the thumb and finger of the left hand, commence at the extreme point of the cane, and wrap the raffia thread evenly and closely round for about an inch (Fig. 7).

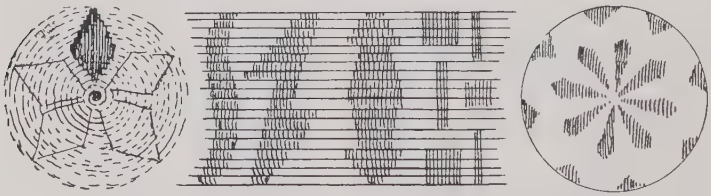
Then coil the wrapped end upon itself, making the smallest of discs, and secure by a stitch taken over the cane and through the centre. All coiling is commenced in this way, and you must have patience and practise continually until you can make a perfect centre.

The Simplest Stitch in Use: The Lazy Squaw (Fig. 8). To continue, you must know the stitch. There are many stitches, but all are amplifications or modifications of this stitch.

(1) Take the coil already started and, holding the centre in the left hand, pass the sewing thread once over the cane which is to form the next round of coil.

(2) Pass the thread again over the cane and into the centre hole of disc.

Repeat (1) and (2) all round and notice how the stitches appear alternately long and short.



METHOD OF PLANNING DESIGNS: ANY OF THESE REPEATED WOULD LOOK WELL.

In the *second round* (Fig. 8) the long stitches should come in between those of the first round, so that the needle will not be passed through the centre. In both cane and raffia coiling, *new stitches* have to be introduced to fill the increasing spaces caused by the increasing circumference. Place these regularly and with judgment between two stitches of the previous round ; and always keep stitches pointing to the centre.

How to Join. (*a*) The thread ; (*b*) the coil.

When a new thread is needed, lay the old thread along the cane for about an inch. Place the new thread along with it, wrap it round twice, and go on working. The old thread will lie from right to left, and the new thread will lie with it. Continue to sew over both ends until they are well covered, and then cut them off closely, proceeding with the new thread.

To replenish the coil, splice, i.e. pare, the old cane on the underside, and the new cane on the upper side, for about an inch. Hold them firmly together and go on working.

Introducing a colour for design. All new colours must have a needle each, and the thread is carried along under the other stitches, behind the cane, until they are needed, and are brought out *under*, and not over the top of, the cane.

Fastening off. Pare the cane for an inch on the under side. Sew over, and pass once or twice backwards and forwards and cut closely.

Suggestions for Application of Work.

Shallow biscuit baskets, bon-bon baskets, trinket trays, etc., can be made in basketry, with cane foundation, and in the same way as that described for making the soft coil.

Baskets with handles and lids can also be made, and the shapes and uses of these are practically infinite.

Further Stitches.

Illustrations of other stitches are given so that the work may be varied, and doubtless students will find other ways of arranging stitches. Experiment is the very essence of development, and boldness meets with its own reward. Figs. 10, 11, 12, and 13 show the stitches.

Bibliography.

Basket Making. T. Okey. (Pitman.)
Raffia Work. A. H. Bowers. (Pitman.)

The Cost.

Capital Cost. For twelve pupils, only twelve tapestry or rug needles are needed, and the cost of these is 6d.

Annual Cost. For twelve pupils, the annual cost would be £3, and this will be much reduced if finished work is sold.

BASKETRY IN WILLOW.

Description.

This work is suitable for older children. Juniors would find the willow rather hard stuff to manipulate. Baskets are made with either white or brown willow. The white has been peeled, while the brown still retains the bark. The latter is half the cost of the former. In making baskets with willow, the processes differ somewhat.

In cane weaving, the bottom is woven on strands that are long enough to make the sides also. In Willow Basketry this is not so ; the bottom strands are made long enough to contain only the bottom. The strands or spokes for the sides are inserted after the bottom has been woven.

Processes of weaving, too, are different, because of the limited length of the willow as compared with cane.

Shaping and forming are more difficult, because the willow is not so pliable as the cane. Neither is it so uniform in thickness, since it gets smaller from butt to top ; and the rule to follow in

"continuing" a weaver is to put butt to butt and top to top. This means that when one weaver has finished, a new one must be put in to continue; if the old weaver finished at its top end, then, in putting in the new weaver, begin at its top end and overlap the top end of the old weaver with it; when this second weaver comes to an end, it will do so at its butt end; then the third following weaver will commence by overlapping the butt end of the old weaver with the butt end of the new weaver.

With cane, the weaving is generally done with a single weaver. With willow, generally, three are taken at once. Willow weaving looks more untidy during the process by reason of the more numerous ends; but these are eventually cut off, and the result is quite good.

The willow has to be kept damp, and a good way to do this is to wrap bundles of willow in damp cloths.

A very important rule to be followed in all weaving operations is that the number of spokes or strands shall be odd. Thus, on referring to Fig. 15, page 77, it will be seen that six spokes crossed each other, making twelve ends. The thirteenth, making the odd, is obtained by the addition of the end of the first weaver (Fig. 19).

The Tools.

The fingers, generally; a pocket knife; for square baskets, a cramp of the kind shown in Fig. 16. This can be made of two pieces of wood fixed together with two bolts. The object is to hold the ends of the spokes so that they remain upright and parallel to each other, while the weaving is done round them.

A tool as shown in Fig. 17 is used to split the willows for fine weaving.

A board, with a bradawl, is useful to fix the bottom to, the bradawl being driven through its centre. The basket turns on this and is well held for the weaving to be done (Fig. 18).

The Materials.

Brown and white willow. For some purposes, rush is used, either flat or plaited, brown or green. Cane, either pulp or flat, is often woven round willow spokes.

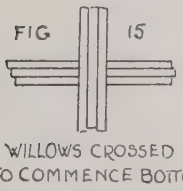
Description of a Particular Example of Willow Basket Work.

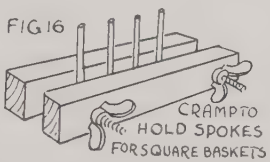
A Round Occasional Basket.

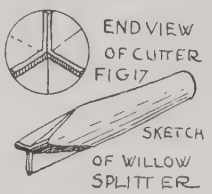
(1) Cut six strands or spokes to the length you wish to have the diameter of the bottom of the basket, with an additional allowance of about 1 in. for inequalities in getting the spokes crossed at the centre; any projections can be cut off when the weaving is done.

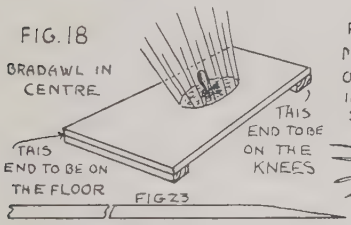
Cross these as in Fig. 15. Place the first weaving willow, with

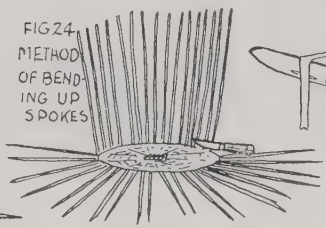
its long end pointing to *N*, by the side of the top three spokes as in Fig. 19. Bend this back under the spokes marked *E* as in Fig. 20, and take the end over *S*, under *W*, over *N*, and then under the two spokes to the left in *E* (standing at the centre and looking outwards) and up through *O*, as in Fig. 21.

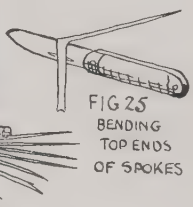


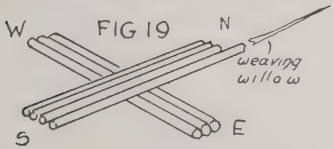


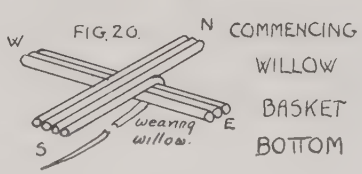


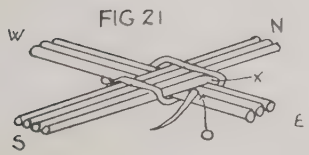


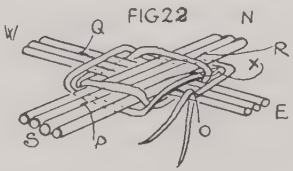












THIRD AND FOURTH STAGES IN COMMENCING BASKET BOTTOM.

In Fig. 22, at *X*, from above, insert the sharpened end of a second weaving willow, and take it under *S*, over *W*, under *N*, and over two spokes of *E*, and down through *O* (where the other weaver came through upwards).

The two weavers are now together, one to go downwards, and one to go upwards. This is double weaving, and it is stronger and more suitable for the work these baskets are intended for than the single weaving. Now go round all the strands with both weavers,

counting two spokes on the left (again supposing you are standing at the centre, looking outwards). Thus, the weavers go through *O*, *P*, *Q*, and *R*, crossing each other in direction each time. The next time round separate the spokes, and weave through between each, and continue until the bottom is of the required diameter.

Keep the bottom concave, as the basket will stand more steadily. Follow the weavers with finger and thumb, pressing them over, and pushing them up from under the spokes, and, at the same time, keep the spokes at equal distances from each other. Remember that once a weaver is bent it remains so ; so take care to bend it through only when you are sure of the position of the spoke.

When a weaver requires renewal, slip a new one in by its side and continue with the new one. Remember the rule of top to top, and butt to butt, in thus renewing a weaver.

Remember to keep the weavers damp.

(2) Cut off the ends of the spokes. Take the upright spokes, two to each bottom spoke, except one (to keep the odd number), and trim each end to a long point with a sharp knife (Fig. 23).

Insert these, one on each side of each bottom spoke, except the single upright spoke needed to keep the odd number. Wet the ends and they will go on better. All the willow should be damp.

With the knife in the right hand, press on each pair of spokes, and with the left hand turn them up to the vertical plane, as in Figs. 24 and 25.

The next step is to bind the edge, and fix the upward spokes.

Take three weavers and insert them one by one, and take each over two spokes and then under one all the way round. This fixes the up spokes at the bend.

Then take another row of three weavers in the same way, but now definitely on the up spokes. These latter are now quite fixed, and their direction, outwards or inwards sloping, should be considered.

(3) The up setting weaving is now done. Four weavers are taken at once ; it is well to have these of varying lengths so that, when renewals become necessary, they will take place separately, and not all in one place.

Begin all the weavers at their butt ends. Weave alternately, in and out, renewing where necessary, top to top and butt to butt, and take it up as far as you need.

Keep keen eyes on the shape of the basket, holding the spokes carefully with the thumb and finger while the weavers are going round them.

To vary the weaving, the weavers may be woven two at a time, instead of four ; and plaited rushes may be used, or cane, or brown and white willow can be varied.

When nearing the top, take three weavers, inserting them one

at a time, and weaving two in front and one behind, i.e. the weaver goes in front of two spokes or strands, and then behind the third.

Then another row of three weavers can be taken, and these two rows will stiffen the basket and make a good top finish.

(4) The spokes will be sticking up some inches above these last two rows. About $1\frac{1}{4}$ in. up, bend them as shown in Fig. 25, and afterwards use them as weavers.

Take them each two over on the outside, and then alternately, sloping them gradually downwards.

As you go round you will find that the space gets gradually well filled, and a neat, strong, good looking finish results.

Cut off all ends, which should have been left projecting on the outside, and turned downwards.

(5) The handle has now to be put on. Take a piece of willow about $\frac{3}{8}$ in. thick, and sharpen each end. Now insert these ends as far as you can between the weavers.

If the ends are damped, they will go in more easily. Bend the handle to a nice shape. Take rattan cane (about $\frac{1}{8}$ in. thick) and thread it through the weavers about $2\frac{1}{2}$ in. down; wind it spirally round the handle, thread it through in a similar place at the other end of the handle, and return, laying it alongside the first spiral.

Do this again at the other end, and return; and yet again, until the handle is filled.

Finish at one end and bind tightly and insert the end in the weaving and tuck away. When the cane and willow are dry, the shapes and twists will be set hard and firm.

The basket is now finished.

The Further Road.

Practise constantly, keenly noting other baskets—round, square, elliptical, with straight, curved, and sloping edges; with plaits on the top edge like clothes baskets, dinner baskets, and other baskets with lids.

Bibliography.

Basket Work. T. Okey. (Pitman.)

Cost.

Capital Cost. About 1s. 6d. per pupil.

Annual Cost. About 2s. 6d. each pupil, but the sale of articles will probably entirely balance this.

CHAPTER XII.

POTTERY.

Description.

This is a development of Clay Modelling, dealing with the making of articles that will be ultimately painted, glazed, and fired, so that they will be permanent. Under this head will come articles of use and articles of ornament.

Here it may be well to remind ourselves of the connection that exists between construction and ornament. No object should exist simply because it is ornamental. It should exist for either a practical or a noble purpose. If it is a teacup, or a flower vase, or a statue, all is well, for each has a good reason to exist.

The craft depends upon artistic ability more than upon manual dexterity. The design for the object arises in the author's mind, and the plastic clay is built and pressed by his hands and fingers until the needful shape appears.

A potter's wheel is useful for circular objects, not only to enable a truly circular shape to appear, but to ensure a uniform thickness—which is such a necessity in objects that have to be burned.

But for school work we are rather concerned with the discovery and development of hidden powers than with the manufacture in bulk of utilitarian objects, so that we can devote our energies to this end, and for a long time, at any rate, can dispense with the potter's wheel.

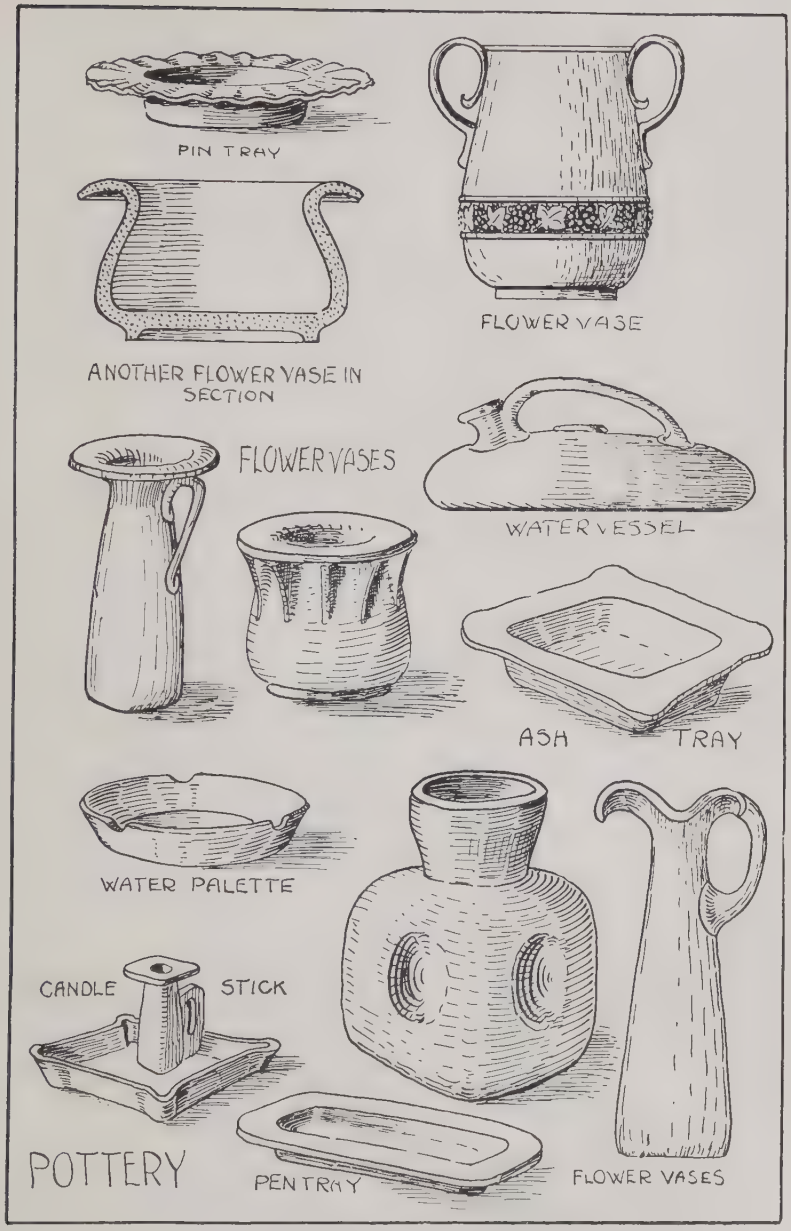
Pottery making really does gives splendid opportunities to children to discover for themselves any tendency they may have for creative art. Once discovered, let us take good care that it is never lost sight of, because, if it is kept alive, it will be a most potent force for individual development.

It is not necessary to go far beyond the simpler forms of pottery, such as a simple dish, or a pin bowl, or a plant dish.

There are two methods of building pottery. One is by taking a lump of clay whose size has been estimated, and, with the thumb, pressing it out and so shaping the object desired by finger pressure.

The other method is by building up in coils, adding coil after coil until the requisite height has been reached. Then the sides and other parts are smoothed and left to dry. When dry, the surfaces, inside and out, are scraped and glass-papered to an even thickness and a surface smoothness.

They can be left like this, or they can be painted or otherwise decorated ; or they can be dried and baked in an oven so that they will be more permanent, although this baking does not make them usable. To be of permanent use they need glazing and kiln-firing.



Designs for Pottery.

A gas muffle will do this. Alternatively, they may be sent to a clay kiln and there burnt.

The Tools.

(*a*) Chiefly the fingers.

(*b*) A few, say 6, modelling tools.

(*c*) Glass paper and knife ; some steel cut to various shapes will be found useful to scrape small curves and unusual shapes.

The usual bench equipments that are used for clay modelling.

The Materials.

Clay, Colours, and Glazes.

Description of Particular Examples of Pottery.

(*a*) A Pin Tray (page 81) ; (*b*) A Flower Vase (page 81).

A Pin Tray.

(1) Take a piece of clay which you estimate will be big enough to make the tray, and make it circular and about 1 in. thick.

With the thumb make a depression in the centre, and keep turning the block of clay round, thus widening the depression and also lowering it.

By finger work, thin the clay and form the edge with its characteristic pipings or flutings. Some of the work can be done with the tray in the hands entirely. Keep the whole as uniform in thickness as you can ; if there is uneven thickness, more strain is set up in drying and in burning, and more risk of cracking is entailed.

Keep the work damp, and carefully note the condition of the clay, which should work freely and easily.

(2) When the pin tray is finished and it has dried hard, go over it with a scraper and glass paper, to get the thickness uniform and to smooth the surfaces.

(3) It can now be left as it is, or it can be decorated with water colour or oil colour ; or it can be lightly polished with French polish applied with a camel hair mop, or varnished.

(4) It can be baked in an oven and then painted ; or it can be glazed in colour and burnt in a gas muffle ; or it can be sent to a pottery kiln. In any case there is always risk of breakage, and you will not get, as a rule, a greater percentage of successes than 60 or 70, and probably less.

A Flower Vase.

(1) Roll the clay out into thin rolls of convenient length ; you will need many of these.

Commence by coiling the first roll, for the base, and then taking it upon the outer ring to commence the side. Pack the coils as you go along and make a uniform thickness. Keep your eye upon

the shape of the outline. Have your drawing before you so that the outline can be easily compared with it. Keep adding coil after coil until you have got to the full height.

It is an advantage to let the lower levels dry somewhat, so that they may be firm enough to take the upper coils.

A keen eye will have to be kept upon the vase, in view of the tendency of clay to settle down.

(2) Make and fix the handles. Use wet clay as mortar to fix the handles to the body of the flower vase. Press them well in, and see that the clay of the handles forms part and parcel of the clay of the body.

With the modelling tools form the edge and make the band of decoration round the body.

Now let it harden, and treat it as already suggested for the first example.

The Further Road.

Read the directions given under this head in Chapter V on Clay Modelling.

In addition, it is well if you can possibly pay visits to a pottery and see the potters at work ; how they form their work, and how the colour and the glaze is applied, and the firing is done.

Bibliography.

Chapter on " Pottery " in *Clay Modelling*. Stewart Taylor. (Pitman.)

The Amateur Pottery and Glass Painter. E. Campbell Hancock. (Chapman & Hall.)

China Colours. E. Campbell Hancock. (Hancock & Son, Worcester.)

All Encyclopaedias have some reference to Pottery, from which valuable information can be gained.

The Cost.

All this will be included in Clay Modelling, because no extra tools are needed, except, of course, the gas muffle, if the pottery is to be baked in school. The gas muffle itself is expensive, and consumes a lot of gas, but it is a great convenience.

Failing the gas muffle, the objects that need firing are best packed in a box of the size of an empty margarine box ; cork crumbs should be used for packing, and the objects should be kept separate.

Boxes of the size suggested are easy to handle, and are not so likely to be badly bumped as would a larger box. Use many such boxes rather than one large box.

CHAPTER XIII.

EMBROIDERY.

Embroidery is the decoration of woven material by designs that are worked in the fabric by means of wool, linen, cotton, or silk thread. The first essential in respect of the workmanship is to get to know the correct stitches. Perhaps the best way is to have a sample of linen, and to work the stitches in this, either numbering them in reference to an index, or actually lettering them on the material. The correct application of the stitch should be shown at the same time. The opportunities to apply embroidery to actual useful objects are many. The home and personal requirements afford plenty of scope. For the former, bed and table linen, covers for sideboards and tables, table centres, and curtains lend themselves happily to the worker, giving plenty of opportunity for originality in style and colour.

Much judgment must be shown in choosing both the object to be decorated and the style of decoration or ornament applied ; for what would be quite in keeping with a country cottage would be sadly out of place in a town villa, and *vice versa* ; moreover, the general colour scheme of the room for which the article is intended must be considered, else what is a beautiful piece of work individually can have its value quite depreciated by being out of harmony with its surroundings. Dress ornamentation gives the worker an opportunity to give that personal finish to her clothes that every one desires, and here lies a very large and desirable field.

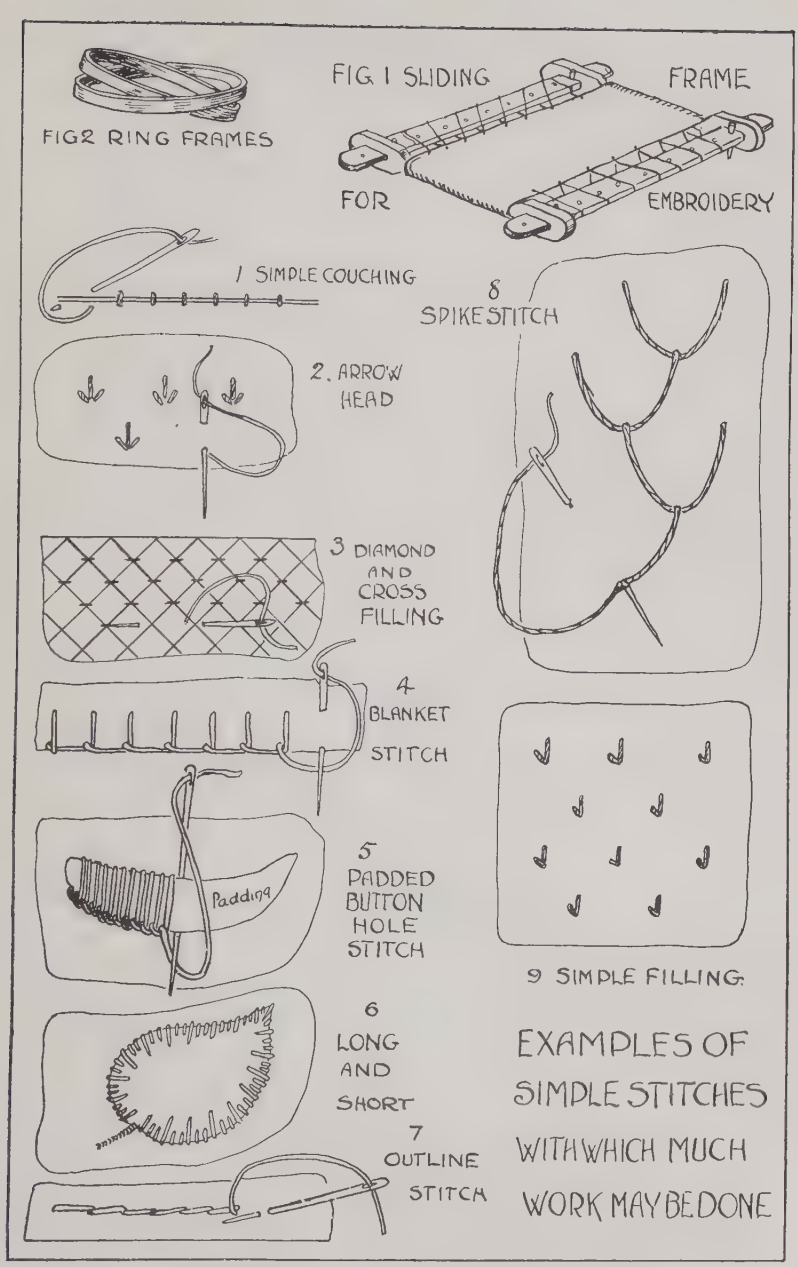
The Tools.

Few tools are needed, but they should always be the best procurable, and always be kept in good condition. For simple designing there will be required one pair of compasses, a ruler, a pencil, and some tailor's chalk.

Needles are indispensable, and should be the best obtainable as common ones are not well finished. These latter cut the thread, are liable to bend, and quickly lose their points. The eye should take the thread easily and loosely.

Round-eyed needles are used for plain sewing, fixing, and finishing work. Long-eyed needles are the most useful for embroidery. Crewel needles have eyes of moderate size and long stems. Chenille needles have very large eyes ; both these kinds have sharp points and will carry all kinds of threads and will work on any material. For work on canvas, the blunt tapestry needle is used.

There are many other kinds of needles, but those mentioned will supply the needs of the average worker.



Instructional Details for Embroidery.

Two pairs of scissors are required, one large enough to cut out material, the other small; curved manicure scissors are very useful, as the curve allows easy cutting close to the material. Keep the scissors sharp.

An old worn thimble is better than a new one, as the latter, and especially one that is fancy edged, will catch in the material and will spoil the thread. If for any reason a thimble does get rough, rub it with fine emery cloth. A stiletto is necessary for piercing holes and when ending cords. Pins of fine steel are needed.

For appliqué work, a knife is preferable to scissors, as the latter are apt to roughen and stretch the edge of the material. The most suitable knife is the ordinary office "eraser." Both edges are sharp, and the end is gently rounded. In cutting appliqués, a sheet of lead fastened to a board is needed. A wooden board is liable to make the knife run with the grain, and spoil the pattern thereby.

An embroidery frame is required (Fig. 1); the ring frame (Fig. 2) is apt to mark the work, but this can be obviated to some extent by placing a piece of flannel between the work and the outer edge, cutting away the centre.

Materials.

Under this heading will be included suitable fabrics for embroidery and the threads that go with them. Before selecting a material, several points should be considered—

(*a*) What article is it needed for.
(*b*) What scheme of colour is to be followed.
(*c*) Whether it is desirable to use a washing material.
(*d*) What the final cost of the finished article is to be.

For washing materials, linen, canvas, and hessian are always useful, but in the case of colours, only fast dyes should be used, else the first wash will probably ruin the whole thing. Where the article is needed for hard wear, such materials as tussore, poplin, tricolene, and washing Jap silk are to be recommended. Various silks and satins make good grounds, the darker shades giving better results than the lighter. For rich work, velvets, especially those with a short thick pile, make beautiful grounds.

In the choice of a ground, it should not be forgotten that embroidery is to enrich, or show up, various special points of beauty; therefore the ornamentation must not be subservient to, but dominant over, the foundation.

Threads. Cotton and linen threads of various sizes are very successful. The latter, being more durable, should always be used for linen grounds, and for lace making.

Woollen Threads are of many makes, the most useful being single and double crewel and tapestry wools. The first is suitable for

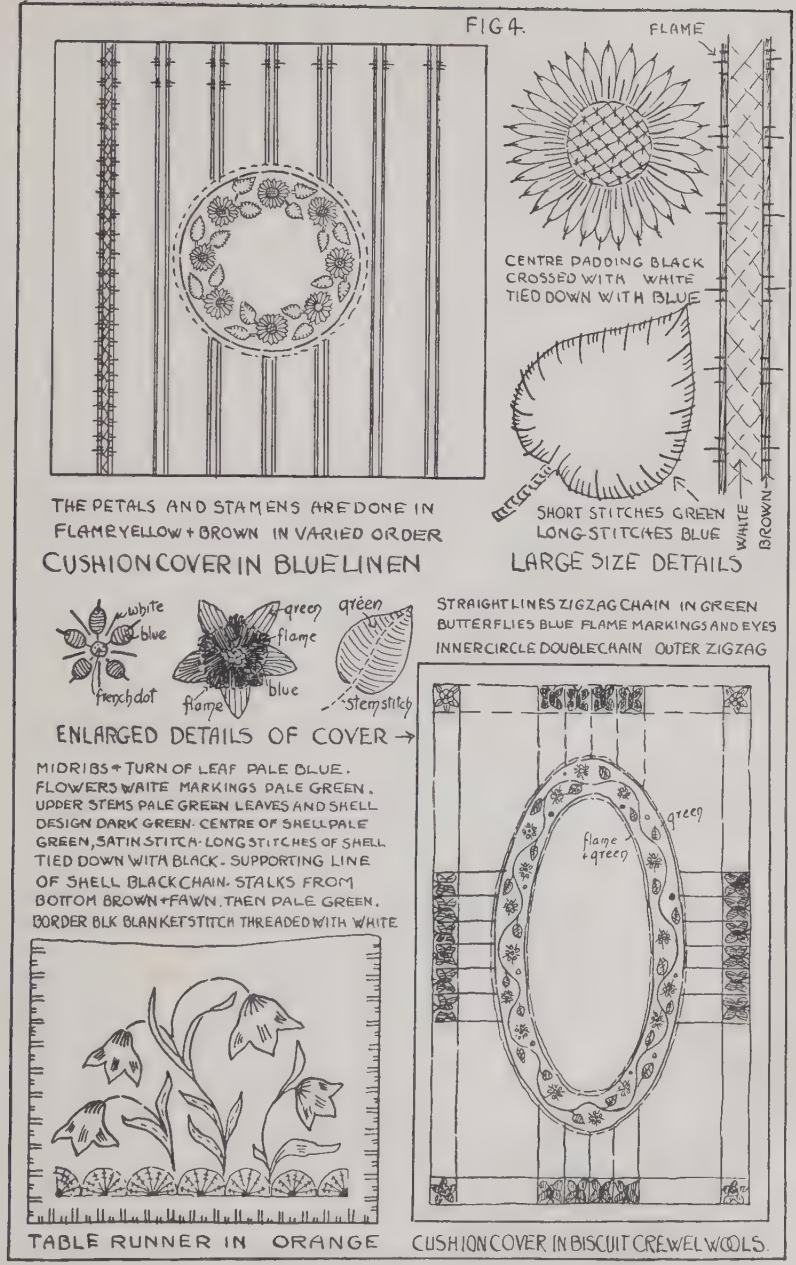


FIG 4.
FLAME
CENTRE PADDING BLACK
CROSSED WITH WHITE
TIED DOWN WITH BLUE
SHORT STITCHES GREEN
LONG-STITCHES BLUE
WHITE
BROWN
THE PETALS AND STAMENS ARE DONE IN
FLAME YELLOW + BROWN IN VARIED ORDER
CUSHION COVER IN BLUE LINEN
LARGE SIZE DETAILS
white
blue
french dot
green
flame
blue
flame
green
stem stitch
ENLARGED DETAILS OF COVER →
STRAIGHT LINES ZIGZAG CHAIN IN GREEN
BUTTERFLIES BLUE FLAME MARKINGS AND EYES
INNER CIRCLE DOUBLE CHAIN OUTER ZIGZAG
MIDRIBS + TURN OF LEAF PALE BLUE.
FLOWERS WAITE MARKINGS PALE GREEN.
UPPER STEMS PALE GREEN LEAVES AND SHELL
DESIGN DARK GREEN. CENTRE OF SHELL PALE
GREEN, SATIN STITCH. LONG STITCHES OF SHELL
TIED DOWN WITH BLACK. SUPPORTING LINE
OF SHELL BLACK CHAIN. STALKS FROM
BOTTOM BROWN + FAWN. THEN PALE GREEN.
BORDER BLK BLANKET STITCH THREADED WITH WHITE
green
flame
green
TABLE RUNNER IN ORANGE
CUSHION COVER IN BISCUIT CREWEL WOOLS.

working up on linen and woollen materials, and the latter, as its name implies, is a coarser thread, and is suitable for canvas.

Raffia is another delightful medium to work with. It can be bought in coloured skeins, or, if the worker desires, it can be obtained from the florists in its natural state, and dyed at home to the shade required for the work in hand. (*See* Basketry section for raffia stains.)

Silk Threads are various. Floss is beautiful, but it is not easy to work. Filo floss, which is a two-ply slightly twisted silk, is much easier to work, but loses somewhat in appearance. Mallard is a coarse twisted thread, and is perhaps the one most generally used.

Scheme for Using Material and Threads.

In the early stages, hessian and anchor floss make a splendid combination. This can be followed by canvas worked in crewel wools. Coarse linen, both white and coloured, lends itself admirably to simple designs, worked in a coarse thread, such as D.M.C. for the white, and crewel wools for the coloured. The slightly more advanced worker will be able to get excellent results from the joint use of poplin and silks or wools ; while silks, satins, and velvets should be left to the more experienced worker.

Stitches. The knowledge of a few simple stitches, together with a reasonable judgment in the choice of material, is all that is necessary to produce very creditable work. The stitches should be first worked on a sampler. To make a sampler, obtain a piece of unbleached linen, about 16 in. by 12 in., tack a hem all round, and as each stitch is worked its name should be printed at the side. The simplest stitches are shown on page 85. With these as stock in trade to start with, much may be done.

Simple Example of Coloured Linen Work. (Fig. 4, page 87.)

A Cushion Cover.

Foundation of dark blue linen ; worked with crewel wools. Colours : flame, brown, green, saxe, yellow, white. As the work is intended for a cushion, the foundation and embroidery are strong. The bold design and rich colours are eminently suited to a room of neutral colouring.

(1) The circle should be outlined in tacking threads. To obtain this, tack across the diagonals to get the centre, then describe a circle with a radius of 5 in. Next, space the linen into eight parts, as shown in sketch, and tack lines across. Now the actual stitching can be done. For the flowers, three colours of wool are used, yellow, flame, and brown, picot stitch being used. For the stamens, a contrasting colour is brought in, e.g. a brown flower has yellow

stamens, a flame flower has brown; the centre is padded with black, latticed with white; the white threads are tied down with blue back-stitching.

The leaves are worked alternately, the 1st, 3rd, 5th, and 7th are worked in "short and long"; the 2nd, 4th, and 6th are outlined with outline stitch, with chain stitch lying alongside; the centres are filled in with blue darning. The stems are worked in stem stitch, green in the centre, and brown on each side, all three rows touching. The stripes are worked in white herring-bone, outlined with brown outline stitch; that again is outlined with spaced blanket stitch. One skein of each colour will be found sufficient. The circle is outlined with flame, and, touching, is a row of tacking stitches in yellow.

An Example of Canvas Work.

A Table Runner. (*See* page 87.)

This example was worked on fine orange canvas. As the ground was bright, the colours were fairly subdued. The border was blanket-stitched in black crewel wool, two short and two long stitches lying close together. Then the stitching was darned in white, over the long stitches and under the short, two rows being used. The finished effect of the border is a black and white check pattern. At each end of the runner was a simple design, copied from the growing snowdrop, based on a geometrical foundation. As the design is independent of the border, the geometrical design does not touch it. The supporting line is in black chain stitch, while the shell pattern is in green, long tacking stitches being used; these are tied down with black. The centre is worked in a very pale green. The petals of the snowdrops are white, long and short stitch being used, outlined in pale green with pale green markings. The leaves are dark green, and are worked in double rows of stem stitch, meeting at the centre line; the veining and turned over piece of leaf is in a grey blue wool.

To obtain the natural stem colour near the ground, a drab and light brown were used together, merging into pale green higher up the stalk.

Bibliography.

Embroidery and Tapestry Weaving. Mrs. A. H. Christie. (Pitman.)
An Embroidery Pattern Book. Mary E. Waring. (Pitman.)
Elementary Embroidery. Mary Symonds. (Pitman.)

The Cost.

The *Capital Cost* for twelve students would be as follows: Including scissors, needles, samplers, thimbles, cotton wool, pencil,

rulers, about £3 14s. Of these, stock will already be in existence for plain needlework, so that very little expenditure is needed to extend the work in the direction of embroidery.

The *Annual Cost* will vary very much, but £10 worth of materials, with judicious balancing of the cheaper with the dearer kinds, will keep twelve students very busy. Then most students will buy their own work, and the rest can find an outside market. Again, many students will bring their own materials, so that the problem of cost can be solved comparatively easily.

CHAPTER XIV.

KNOTTING AND NETTING.

This is a most valuable craft which has not been so generally used in school as we should expect. It requires little in the way of equipment, and the cost of string, or rope, or cotton can be brought to a minimum by the sale of the goods made.

So far as knotting is concerned, it must be looked upon as practice in the making of knots, and not as the making of things which can be generally used. But as an accomplishment alone, the power to make appropriate knots at the right time must be looked upon as possessing great value.

Network, however, is of much material value. Net bags, nets for all kinds of garden purposes, and nets for cricket, tennis, and fishing come within the field of activities of the school; and constitute work that arises directly out of the various needs of the school.

KNOTTING.

How Ropes are Built Up.

Ropes are made of vegetable substance chiefly, hemp, coir, cotton, and manilla; or of metal, such as copper and steel. We can safely leave the latter out here, however, and deal with the ropes made of vegetable material.

There are three kinds of ropes, varying in kind according to their laying or winding—

(*a*) *A Hawser-laid Rope* is made up of three strands, and is laid up right-handed, as a rule (Fig. 1).

(*b*) *A Shroud-laid Rope* is made up of four strands, and is laid up right-handed round a heart (Fig. 2).

(*c*) *A Cable laid Rope* is made of three right-handed hawser-laid ropes laid up left-handed (Fig. 3).

Knots are of various kinds, which depend upon the purpose of the knot.

(*a*) One class of knots is that in which the knot is made on one single rope's end. Figs. 4, 5, 6, and 7 give examples in common use.

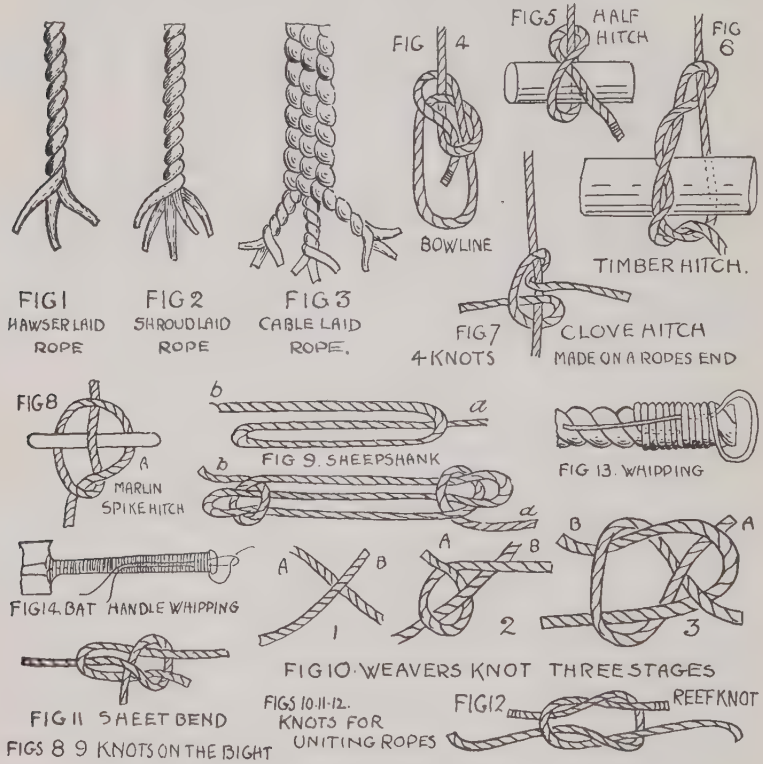
(*b*) Another class consists of knots made away from the ends. Figs. 8 and 9 are illustrations of two kinds in this class.

(*c*) Another class is that where the knots are used to unite two ropes. Figs. 10, 11, and 12 are examples of these.

There is, however, very much more in knotting than this. Knots are formed on a rope for special reasons, out of its own strands. Ropes have to be spliced, and then there are the operations of whipping the end of a rope to prevent it becoming unlaid; pointing

ropes; and making "purchases." Readers must be referred to the books given in the Bibliography for further information on all the many aspects involved in knotting.

Fig. 13 gives the method of whipping a rope; and Fig. 14 the way to fasten the wrapping on a bat handle or blade.



NETTING.

The chief difficulty in making netting is to make the knot. When this difficulty has been overcome, the netting can be proceeded with.

The Tools.

Needles, or shuttles, are required on which to wind the string. They can be made of wood (Fig. 15), or of bone (Fig. 16), or in steel, as in Fig. 17.

Meshes are just pieces of wood, or bone, of a width it is thought desirable to make the mesh. A convenient size is about 6 in. or 8 in. in length, and from 1 in. to $1\frac{1}{2}$ in. in width; although for large nets, larger meshes are needed. (Fig. 19.)

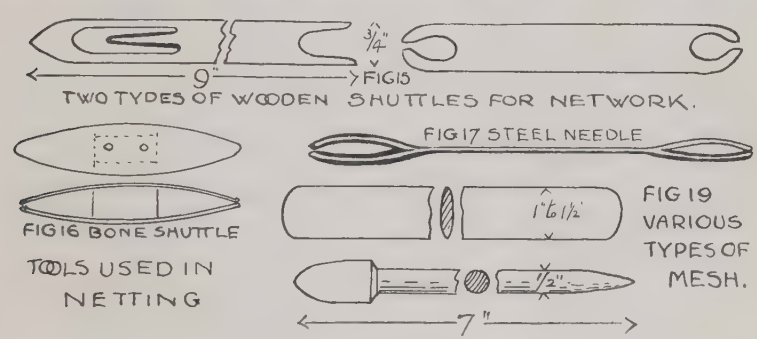
The apparatus needed, it will be seen, is very simple, and can be made in the school or in the Handwork Room.

The Materials.

String of various kinds is all that is needed. Of course, regard must be paid to the purpose for which the nets are needed, and string of suitable strength must be used. The same knot is used for fancy work, and for curtain netting, and for these cotton of suitable thickness is used.

The Description of a Particular Example of Netting.

Any kind of straight net may be woven in this way. Suppose we make a net for laying over a row of peas. If it is 15 in. wide



it will hang over supports and cover the bed quite effectively. It will be as long as needed.

Take a string, say 24 in. long, and fix it to a table or wall, or any other convenient support. Fix it at each end.

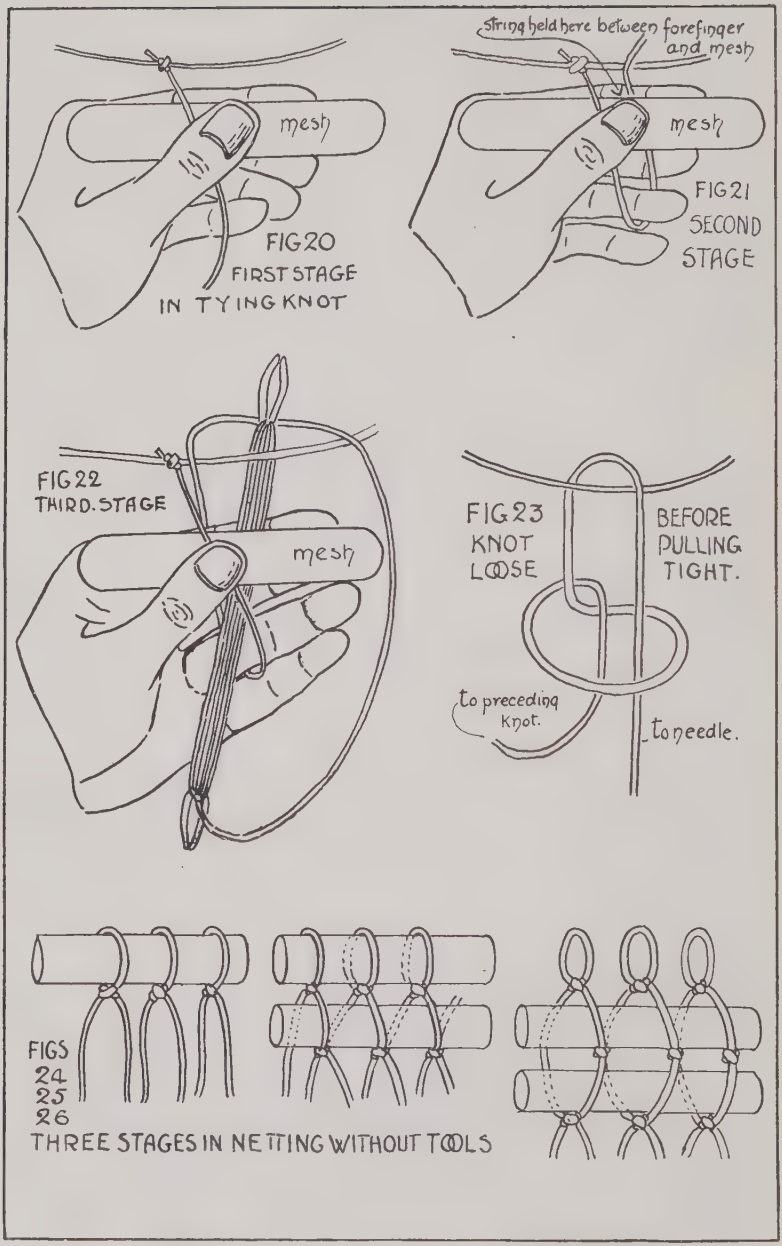
Fill the shuttle with the netting string, and tie the loose end to the fixed string. Take the mesh (Fig. 19) in the left hand and place it as in Fig. 20, with the shuttle string coming over the top.

Pass it over the third finger, and behind the mesh, and hold it then with the finger and thumb that are holding the mesh (Fig 21).

Bring the shuttle round to the right, and then slip it through the loop that is on the third finger, from the left, as in Fig. 22, and under the mesh and under the foundation thread. In this process a loop will be formed which goes over the fourth finger. Take the third finger from the loop, and draw the loop over the fourth finger, very gradually, until it is tight on the top edge of the mesh. The thumb has to be kept tightly on the mesh the whole time.

Do this as many times as you need stitches or meshes in the net. (The word *meshes* here refers to the net and not to the tool on which the stitches are made.)

Turn this row of stitches round, and begin from the left again.



NETTING DETAILS.

Each row of stitches is done in this way, and, of course, after the first row, the stitches are caught on to the lower edges of the previous row of stitches.

Success depends on holding the mesh quite tightly, and in managing the loops over the fingers. Only practice will overcome this.

Fig. 23 shows an enlarged view of the actual knot lying loose, just before it is drawn tight. There is nothing more in netting than just making this knot and multiplying it to make nets of any size. The mesh can be regulated by the wooden " mesh " stick, but the knot is always the same.

In commencing the net, some workers tie the ends of the foundation string together, and pass it over the foot, making it just long enough to keep it tight easily.

This foundation string is cut away later, and does not form part of the net.

An unorthodox, but very handy, way of making netting without tools is shown in Figs. 24, 25, and 26.

Take as many pieces of string as will make the net the width you want it, and double them over a stick as shown in Fig. 24. Tie a knot on each string just under the stick. Then take the back string of No. 2 and tie it to the front string of No. 1, and follow on as in Fig. 25. Take out the top stick and place it ready for the next row, and proceed in similar fashion (Fig. 26).

The Further Road.

Constant practice in the making of all kinds of nets. It will be seen, however, that the making of the knot is the secret ; and the making of this should be practised under all kinds of conditions, backwards as well as forwards, until it can be made automatically and without effort, working from right to left as well as from left to right.

Bibliography.

Knots and Splices. Capt. Jutsum. (James Brown & Son, Glasgow.)
Chapter in *Boy Scout Tests.* (James Brown & Son, Glasgow.)
Chapter in *Rural Handicrafts.* Johnson. (Pitman.)
Chapter in *Handywork.* W. Graystoke. (Nelson.)
Knotting and Splicing Ropes and Cordage. (Cassell.)

The Cost.

Practically nothing, as the tools can be made by school pupils, and the string, being made up into nets, can have its cost balanced by the sale of the finished goods.

CHAPTER XV.

FRETWORK.

Description.

FRETWORK is the cutting, or "fretting," of wood into patterns with a fretsaw. Pieces are cut clean out, and the result of such cutting is to leave patterns in the wood.

Thin wood is generally used; nowadays plywood is found to be very convenient, as it combines strength with thinness and lightness. Plywood is formed of two or more thicknesses. Three thicknesses are most commonly employed, and the wood is then said to be three-ply. The grain of the centre layer is at right angles to that of the other two, and it is this which gives such strength.

Fretwork is a very popular form of handwork, but it has received very little encouragement in schools. Perhaps the reason has been that it has been looked upon as a mechanical form of work; also much fretwork has been done that so frankly and unblushingly transgresses the law of materials as to render the finished objects quite useless because of their excessive fragility. Certainly no article of utility should possess such a drawback as that.

Nothing of this kind is proposed here. The fretsaw (Fig. 1) is a very useful tool, as we have already seen in relation to inlay. It is proposed that this tool shall be used in a legitimate manner, with due regard to the law of materials, and care will be taken that the strength and serviceability of the objects made shall not be impaired.

There are incidental uses to which the fretsaw can be put, as well as its main use.

These are to cut inlay patterns, and to cut fretted patterns in furniture, such as chair slats, pediments, and drops.

Fretwork is difficult to polish, and consequently a wood should be chosen that can be finished with a material like raw linseed oil, which spreads easily into acute angles and narrow spaces.

The Tools.

For Each Student. (*a*) A fretsaw, 12 in. frame (Fig. 1); (*b*) A sawing board with cramp (Fig. 2).

For Class Use. Six bradawls, assorted sizes; glass paper and rubber; one scraper; one dozen fretwork files; three hammers; three small screwdrivers; one glue pot and brushes; one archimedean drill; one 18 in. saw frame; one piercing saw frame; tracing and carbon paper; paste; several dozen fretsaw blades.

Each student will need a fretsaw frame and a sawing board.

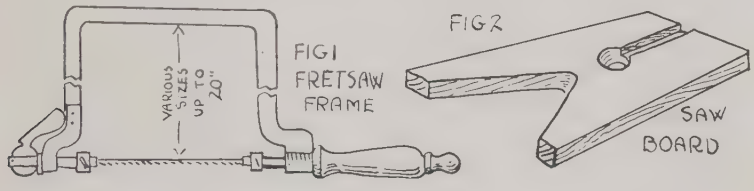
The fretsaw is used with a downward stroke, and this means that it must act clear of the bench or table. The sawing board in Fig. 2

enables this to be done. It is fixed to the table or bench by means of a cramp. The scrapers and glass paper are needed to smooth the surfaces of the work ; the files to smooth edges.

The large fretsaw frame is necessary in cases where very wide pieces of wood have to be cut.

The piercing saw is a very useful tool for small work, and for ivory, mother of pearl, and sheet metal cutting.

The archimedean drill is used for drilling the holes through which the fretsaw is threaded.



The Materials.

The usual run of cabinet woods, generally in thicknesses of $\frac{1}{8}$ in., $\frac{3}{16}$ in., and $\frac{1}{4}$ in., are most commonly used ; but woods of a thicker size can also be done with the saw ; progress is slower, and the risk of breakage is greater. So much here depends upon the patience of the boy.

Three-ply wood can be had faced with walnut, mahogany, oak, and some other woods, as well as in just plain alder.

Composition board, or Beaver Board, can be used for more open designs.

Thin copper and brass and pewter sheet can be fretted. Have it not thicker than 23 or 24 gauge.

Panel pins, needle points, glue, fine screws (preferably of brass) are used to fix the work together. Croid is a useful adhesive.

French polish, beeswax polish, Ronuk, and raw linseed oil are used for finishing.

Description of Some Particular Examples of Fretwork.

The uses to which we can reasonably put fretwork are these—

(*a*) The outlines of pediments, drops, and similar curved work.

(*b*) The decoration of slats for chairs, gates, tables, stool-legs, bedsteads, and similar furniture.

(*c*) In very strict moderation, the ornamentation of panels and front pieces, behind which satin or other similar material is used as a backing. But the law of materials, which excludes excessive cutting across the grain fibres, must be obeyed.

(*d*) Fretting for pierced carving, very notable examples of which are church panelling and tracery for screens, pulpits, and stalls.

(*e*) The cutting of inlays in mother of pearl and ivory, as well as the usual cabinet woods.

(*f*) The fret-cutting of maps and pictures, as "jig-saw" puzzles. A map, e.g. of England, can be cut with the fretsaws along the county boundaries. This is excellent practice, and is definitely correlated with geography with very good results.

(*g*) The cutting of figures for representations of historic scenes, and of geographical features and life in various parts of the globe. The latter are often done in cardboard and paper; if they can be done in wood with the paper front, or, better still, if they can be painted on the wood, they will be so much more permanent.

(*h*) The fretting of metal.

A few notes on the manner of using a fretsaw are given, in place of the detailed description of the working of a particular piece. Fret-sawing is not an occupation that requires a large number of operations. As has already been said, it is mechanical, and it is monotonous so far as the tool operations are concerned. It is, nevertheless, of absorbing interest, and so long as we can get a reasonable type of fret-sawing in vogue, it should be a great stand-by in school craft work.

Notes.

(1) The fretsaw is unscrewed at the top and threaded through the holes that have been made with the archimedean drill in the spaces that are to be cut out. It is then screwed up tightly, and the lever at the top pulled down to further tighten the saw blade. In some frames the handle turns and screws up the blade more tightly.

(2) Note that the saw cuts with the downward stroke; the saw teeth must therefore be pointing downwards.

(3) The blade of the saw must be vertical, except that it may lean slightly forward, i.e. away from the user.

(4) Don't try to cut too rapidly. The saw has a pace of its own, and if forced too much beyond this it will rebel and break.

When cutting along long curves, i.e. curves which deviate from the straight very little, the downward strokes are less numerous compared with the progress the blade makes than when very quick and small curves have to be cut. In the latter case the saw is moved quickly up and down, and makes a very large number of strokes compared with the distance travelled.

(5) Breakages in blades will be frequent, especially with beginners. Experience will reduce the number of casualties.

The Further Road.

Here, again, there is a necessity for the study and practice of design. The method of most fretworkers is to buy their designs, paste them on, and cut them out. This is not ideal; and it is

Designs for Fretwork.

really possible to throw ourselves into our art work more thoroughly than this. We, and the children, may not make designs that are as good as those which can be bought, yet, surely, that is not what we, as teachers and developers of the child's powers, are principally striving for. Read Ruskin in *Stones of Venice*, Vol. 2, Ch. vi, Pars. 11–12, and seize on the gospel he preaches there. Work hard at design. Very carefully study the design with reference to the wood. See that the cuts across the grain are few and make your design flow in the way that makes for the strongest design. Very few, if any, members should lie directly across the grain without support.

There should be a good deal of practice with the fretsaw, although it does not take a great deal of time to master its use.

It is on the side of the design where most of the work must be put in.

Work a design for pierced wood carving and get the fretsaw to work on it, and afterwards carve the panel.

This will help considerably in mastering the necessities of design and the difficulties attendant upon the use of the saw.

Practice the use of the saw for the many other types of work that it can be used for, e.g. inlay, metal work piercing, jig-saw puzzles, etc.

Bibliography.

Fretwork. (Evans Bros.)
Hobbies. Published weekly. (Hobbies, Ltd.)

The Cost.

Capital Cost. For twelve students, £4.
Annual Cost. About £3, which will be lessened if students pay for their own wood.

CHAPTER XVI.

WOOD BLOCK PRINTING.

Description.

All illustrations, and, of course, the first printed letters, were done from wood blocks, carved so that their impressions formed the letters and the pictures. Then, with the advent of steel engraving, copper plate, and process work, wood blocks were little heard of. In recent years, however, there has been a revival of wood printing, and a considerable amount of art work is possible in this direction.

Wood of a hard and close grain, generally maple, of type thickness, i.e. $\frac{1}{8}^{\text{in.}}_{\text{in.}}$, is designed, and then is carved so that the letters, in the case of type, and the dark parts, in the case of illustrations, are left full surface height, and what corresponds to ground work in wood carving is cut away deep enough to avoid giving any impression on the printed paper.

For very fine work, the carving is done on the end grain. This wears better, and the lines can be cut finer, because they are not subject to the variability of hardness that always attends side grain in wood.

In cutting these blocks, it will be obvious that they are negative, and they will, therefore, be cut the opposite way to their impression.

For school work they have a special application, inasmuch as they can be cut for title pages, illustrations, and designs for titles, end pieces, and initial letters for school magazines.

A variation of this is the " white letter block," in which the letters are cut away and show white when printed, while the ground work is left, takes ink, and shows the colour of the ink when printed.

Another variation that will afford work of the greatest interest, and calls for much thought and ingenuity, is the making of moulds used by bakers for gingerbread and other cakes and biscuits, and the butter moulds used by farmers and dairymen.

The cake moulds are of use in either town or country ; while in a country district the making of butter moulds is a really popular choice.

Illustrations can be printed in two or more colours, by using as many blocks. This is more intricate, but is not beyond the capacity of some older children.

It is a mistake to generalize and act invariably upon general rules. Much good work in both actual material result and real intellectual and spiritual development is lost because opportunities have not been presented to an intelligent and capable child. It may be true that only exceptional children would take advantage of such advanced opportunities ; but there *are* exceptional children,

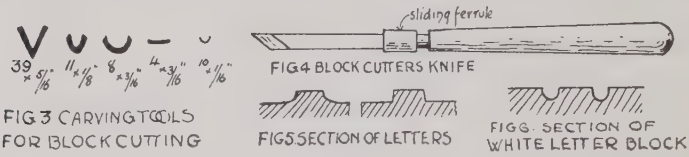
and there is no reason why work that would be "worthy of their steel" should be withheld from them.

If you can enlist the services of a friendly printer, so much the better; and if he will help not only with advice, but by letting the boys and girls who are cutting the blocks see how they are fixed in the machines, it will give them a more intelligent conception of what they are doing. It will make them *think*.

Some block printing can be done by hand pressure only, and some, again, can be printed by a press of the students' own making.

The Tools.

A few carving tools, about four in all, are sufficient for any work of this description. The block cutter's knife (1s. 8d. post free,



from Pitmans, or at any booksellers or artists' colour-men) is essential (Fig. 4).

The desk bench or board shown in Figs. 8 and 8*a* (*see* p. 12) is necessary.

The carving tools needed are shown in Fig. 3.

The Materials.

Well-seasoned maple, $\frac{1}{16}$ in. thick, is what is used for wood block making. Of course, any thickness of wood will do (so long as it does not warp) if the printing is to be done in any other way than by a printing press.

A letter copying press is a useful thing to have for pressing; and a bookbinding press can be arranged so that it can print also.

The wood should be close in grain and hard.

Description of Particular Examples of Cutting Wood Blocks.

(*a*) Design for a Magazine Cover (Fig. 1); (*b*) White Letter Block (Fig. 2), both on page 103.

Design for a Magazine Cover. (Fig. 1.)

(1) Draw the design upon the wood, and note that it must read from right to left.

Begin by cutting away the waste wood with a gouge (Fig. 3*c*) to the depth of about $\frac{3}{16}$ in. Cut in regular strokes always. Careful and thoughtful work must be put into every cut. If possible, cut across the grain; you can get the wood out much more evenly in

Designs for Wood Block Printing.

this way. In any case, take short cuts rather than long ones, and avoid tearing or levering the wood out.

Now get closer to the outline of the letters and of the design. A "V" tool (Fig. 3*a*) or a fluter (Fig. 3*b*) will do very well for this.

The section of the letters given in Fig. 5*a* will show that a curved section will give greater support than the one given in Fig. 5*b*.

It will be seen that every piece of wood is cut away by direct cutting, and not by the "setting in" known to the wood carver. The block cutter's knife is used for this work.

(2) Now reduce the ground work to a smoother surface. It is not necessary that it shall be quite flat and smooth. The need is to have the ground deep enough to keep clear of the paper when the printing is done. The tool shown in Fig. 3*d* is needed for flattening the ground.

(3) Now compare the block very carefully indeed with the design, and correct where it appears to be necessary.

Then have a "pull" taken of the print. Again compare with the design, and mark the places very carefully where correction is needed.

It ought to be needless to say that the surface of a block should be very carefully dealt with, and on no account should it be knocked or scratched. All marks will show quite clearly in the finished print. Have a soft pad for the block to rest on, of felt, velvet, or anything else with a soft texture.

(4) A coat or two of polish applied with a brush and then "cut down" with glass paper will provide a good finish.

A White Letter Block. (Fig. 2.)

The word "Tools" is shown on this block; and the cutting is not difficult. The part that is cut out shows the paper; and the part left in is inked, and is printed on the paper. This is a reversal of the previous process, as regards design.

(1) Draw or trace the design upon the prepared wood. Then cut out the letters and lines with the fluter or the special block cutter's knife. Keep the edges clean and always cut so that the tool leaves a clean surface.

Then finish as described in the preceding section.

Fig. 6 (page 102) shows the section of letters in a white letter block.

The Further Road.

In all the crafts, it is a very decided advantage to get to know an expert; and it is well, having once begun block cutting, to get expert assistance as you get to more advanced work.

Nevertheless, by following the advice contained in a first-class

book, an intelligent student will be able to go ahead very well. Better advice than to get the book mentioned below cannot be given.

Bibliography.

Wood Block Printing. F. Morley Fletcher. (Pitman.)

The Cost.

(*a*) *Capital Cost.* For three students, about 10s.
(*b*) *Annual Cost.* For three students, from 10s. to 15s

CHAPTER XVII.

POKER WORK.

Description.

The name originated from the use of a heated poker or bar of iron to burn names and designs in wood. If you try this, you will find that, when very hot, the poker burns too well, and that it soon loses heat, and then burns slowly. When very hot it will make black marks, and when cool only faint brown marks. Nevertheless, skill can be developed even in using a poker, and by carefully planning your work, and noting the places where black, dark brown, light brown, and pale brown are needed, and putting them in just when the poker is at the right heat, you can achieve a good deal.

The next stage was to try to obtain continuous heat so that the iron would always be ready. Of course, one could have several irons always heating, and so overcome the difficulty partially in that way. But that was a clumsy method, involving the continual use of a fire.

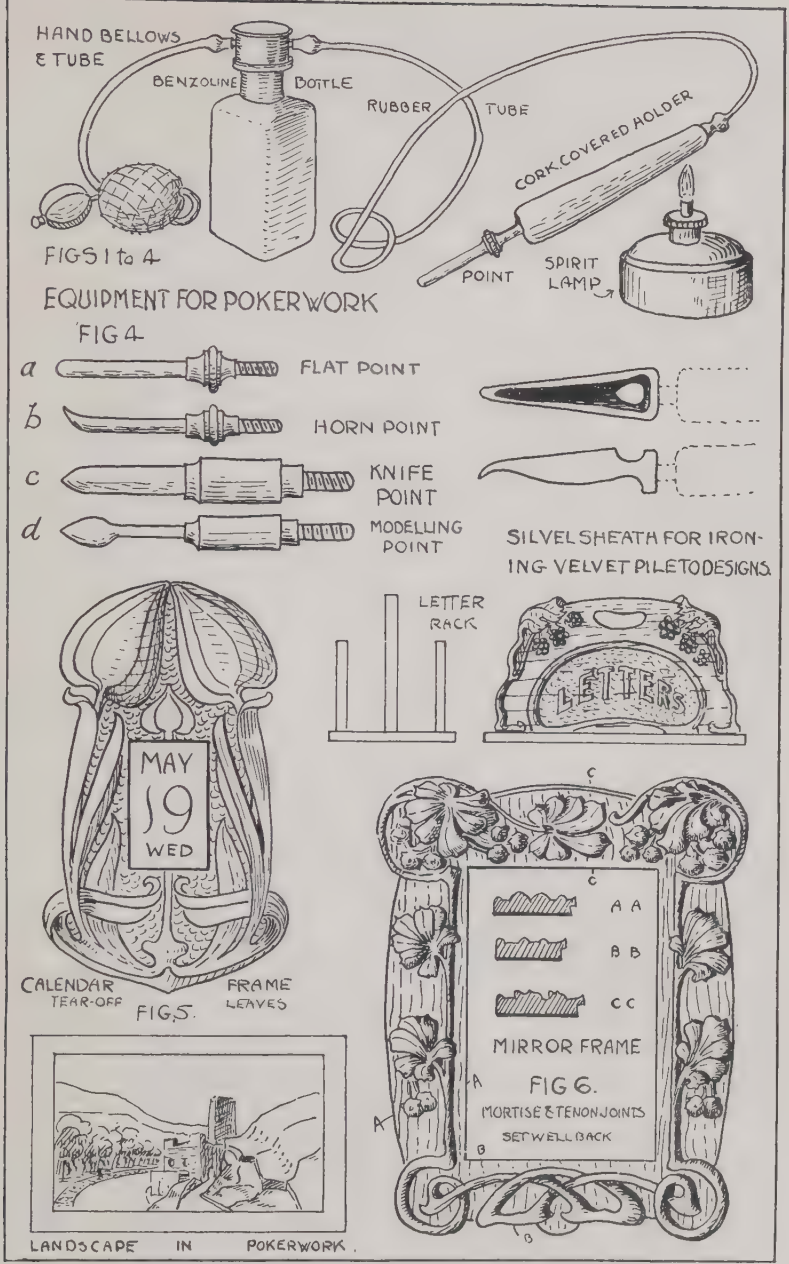
The fixing of a gas jet to the iron marked a great advance ; and this method is worth trying when other means are not available.

Nowadays, poker work is done by means of "poker points," which are made of platinum, and which are hollow. They are screwed into a cork-covered holder which is also hollow, and a rubber tube is fixed to this, and carried to a benzoline bottle fitted with a special stopper. This stopper has two hollow arms or nipples, upon one of which the rubber tube from the cork holder is fixed, and on the other is another tube which has a rubber bulb at the end. This, when squeezed, forces air into the bottle and blows a continuous current of spray from the benzoline to the point. The point is heated in a methylated spirit flame, and then it keeps continuously hot, so long as a stream of benzoline spray is pumped along. The heat can be regulated from dull red to white. The points are of many shapes, thicknesses, and curves.

Designs in all shades of brown can be done on the flat, on all kinds of articles. Generally, a light-coloured wood is used.

Plush is also "pokered," and some charming effects can be obtained by the use of the poker points and oil colour.

Besides work on the flat, which really is drawing, work can also be done in relief. For this, the ground is taken out with one or two carving tools, and the design left high. It is then shaped with the poker point. This really burns the wood to shape. It is then coloured with stain and wax polished.



Designs and Details for Poker Work.

Very great possibilities lie ahead of the enthusiast in this kind of work.

Poker work can be done on leather, linoleum, and cardboard.

There is a kind known as *Silvel*, which consists of flattening or ironing the pile of velvet into designs of a peculiarly silvery nature, by means of a sheath which can be fixed over the poker points. This is very fascinating work. Cushions, table mats, table centres, sideboard covers, and similar articles can be ornamented with this work.

The Tools.

Figs. 1 to 4 give the equipment needed for modern poker work.

Materials.

As a rule, the lighter kinds of wood are used, because the tone of the burning contrasts well with them. Thus, sycamore, lime, chestnut, willow, alder, holly, and canary wood will do well. But darker woods, such as satin walnut, Kauri pine, elm, and mahogany can also be used.

For the relief work, the softer varieties of the above are better, because the harder woods put too great a strain upon the platinum points.

Linoleum, leather, and velvet can also be used.

Description of Particular Examples.

(*a*) A Calendar Frame (Fig. 5), surface work only; (*b*) A Mirror Frame (Fig. 6), in relief work.

The Calendar Frame.

(1) Draw or trace the design. Screw the point (Fig. 4*a*) in the holder and heat it in the flame. Use the bulb and blow the spray into the point. It may be that at first the point refuses to keep hot, because of dust or some obstruction in the hollow point. Keep persevering if this is so; raise to white heat for a second or so, and this will in all probability remove the obstruction. If not, it may be that the benzoline is not quite of the right strength. A little paraffin added sometimes helps.

It will be as well to practise on odd pieces of wood to overcome the strangeness of the point and the few trifling difficulties concerned with holding the apparatus and managing it.

(2) Outline the design, then do the interior lines, and finally the shading. The latter is done with varying degrees of heat. Then take the appropriate point and do the ground work.

One tool, or point, will do a lot of work, and it is well to exhaust its possibilities before buying more.

Poker work is, really, drawing with a platinum point instead of with a pencil.

The Mirror Frame.

(1) Draw the design on, and take the carving gouges to cut away the bulk of the ground. Then heat the knife point (Fig. 4*c*) to just short of white heat, and cut all round the outline to the depth needed. Hold the point upright as nearly as you can in doing this. Some workers cut this outline in first and cut the wood away afterwards.

(2) Cut the design up into its various parts, and then proceed to model the surface.

(3) Tool the ground work and then take a wire brush and scrub the work. This takes the charred wood away, and smooths the surface.

Now stain or polish the design and the work is done.

The Further Road.

Study designs and practise until you can make your own. Read whatever you can bearing upon poker work, using discrimination, and give all the time you can to efficient practice. *Experiment* with the work, and try new effects and new ways of using the tools. There are no public classes in poker work, and few private tutors, so that each worker has to depend upon individual practice for development.

Bibliography.

Poker Work. W. D. Thompson. (Upcott Gill.)

The Cost.

(*a*) *The Capital Cost.* As a rule, for work of this kind, students would find their own equipment.

(*b*) *The Annual Cost.* Next to nothing, as each student would bring the materials, or buy the finished article, ready to ornament.

CHAPTER XVIII.

LEATHER WORK.

Description.

It is artistic and not expensive; real things can be made; it is not noisy, and it can be easily organized.

There are two definite kinds of leather work that can be practised in school, both of which are equally suitable and fascinating.

The first consists of making articles like bags, purses, and cases.

The second is that of embossing leather. This can also be made up into book covers, bags, purses, calendars, and similar things.

The first type can be done entirely in leather. The shapes needed can be cut out, and then laced together with laces cut from the leather itself. The holes are made with a punch such as is shown in Fig. 1. These holes can be placed at various distances, so that ornamental effects can be arranged with the sewing. The sewing is best done if the lace is pointed.

Handles can be made of cord, with the ends knotted and covered with cut leather.

The second type, that of embossed leather, consists of raising designs in a similar way to that by means of which the thin metal repoussé is done.

The leather is first damped, but otherwise the steps taken are the same, and the tools are the same.

This work can be stained and good effects can be obtained.

There are other forms of leather work which are useful as school handwork.

It will be found that when leather is wet it can be marked. Ornamental lines can be drawn with a tracer, and other designs can be arranged with punches of various shapes. A similar effect can be produced by having the irons and tools heated.

Many of the tools can be made from iron rod, or wire, or even nails, so the cost is not great. (*See* Fig. 2.)

Leather can be arranged in "patch work," and this is a very useful way of using up odds and ends Students are thus introduced to an unusual and fascinating method of forming design, and the practice it affords matures judgment and facilitates development.

The patch work can be glued to a backing, or the pieces can be sewn together. Leather can be cut into strips and woven into mats, bags, hat-bands, belts, and similar things.

The Tools.

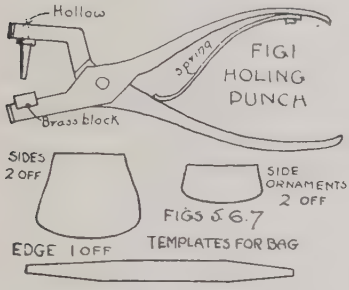
For the first type of leather work the tools needed are punch and scissors. (*See* Fig. 1.)

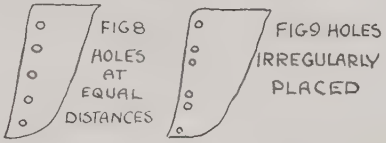
For the second type, the same tools that are used for the lighter kind of repoussé, and shown at Fig. 13.

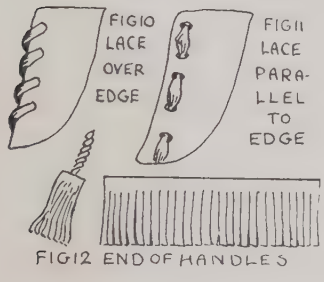
The Materials.

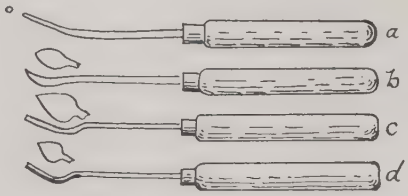
Suede leather skins can be used for both types, and what is known as "belly" leather, in thin thicknesses, is also useful for the embossed work.

Cord, for handles for bags; and rye flour, or brown meal, for filling the embossed work from the back.









Description of Particular Examples of Leather Work.

(*a*) A Hand Bag (Fig. 2, p. 113); (*b*) An Embossed Blotter Cover (Fig. 4, p. 113).

A Hand Bag.

(1) Sketch the outline of the bag carefully and proportion the relative sizes. Then cut paper or thin cardboard templates, and cut the sides and the ends and bottom out to them. Figs. 5 to 7 above give the templates for sides, ends, and bottom, and the side ornaments.

From the waste pieces cut laces of a size that will enable them to go through the holes stiffly; this gives a great holding power.

(2) Now punch the holes with the special spring punch.

The edges of two adjacent pieces are held together and punched. The holes may be at equal distances apart, or they may be arranged at proportionate but unequal distances, as at Figs. 8 and 9.

The holes may be marked by first measuring them carefully on

the paper template, and then, laying it on the leather, prick through, or the template could be (after marking the holes) itself pinned to the leather, and then punched right through.

(3) Now lace the pieces together. The laces may be taken over the edge, or parallel to it, as in Figs. 10–11.

To piece the laces, begin a lace through the hole where the last one finished. At the end of the lacing, the lace may be passed backwards through a stitch, or it may be glued down.

The ornamental piece at the side is cut and shaped as your art sense dictates.

The top edge may be turned over and laced or fixed by the cord.

Slits are cut in the side of the bag, and through the ornamental side pieces, to put the cords through.

The end of the cord is fixed up with a piece of leather cut as in Fig. 12; it is rolled round the cord, which is knotted and glued.

An Embossed Blotter Cover.

(1) Prepare the design, and trace it on the leather.

Cut the leather to size, and pare the edges for turning over, if the leather is rather thick.

The leather known as "belly leather," from which the tongues of children's shoes are made, is rather useful for embossing, and has the advantage of being cheap. The suede leather will also do quite well for embossing. Goat-skin leather is also good.

Then damp the leather; this damping should be effective without soaking. Experience will soon indicate the exact amount of dampness, which lies, probably, on the drier than on the wetter side.

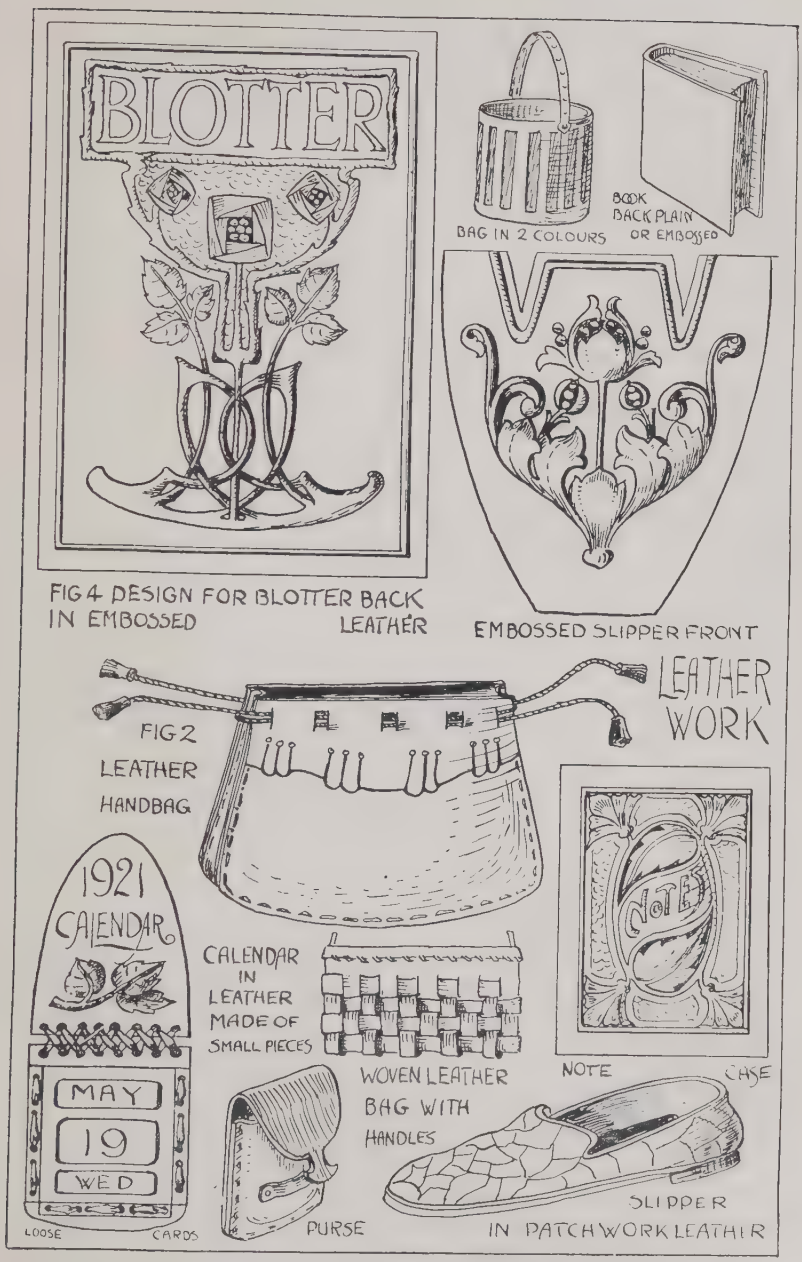
(2) Lay the leather, face upwards, on the glass slab, or slate, or marble, and with the tracing tool (Fig. 13*a*) trace the outline with a good deal of pressure, so that the impression goes through.

Turn the leather over and place it, face downwards, on the felt or on the linoleum. Some workers do one, some the other, but both finish on the felt.

With the tool shown at Fig. 13*b* (p. 111) begin to press the leather out from the centre of the spaces to the outlines. A ball tool is often used for large spaces which need high relief. The leather stretches with the pressure and stands out in relief.

Compare with the design and carefully raise that part of a leaf or petal, or other part, just where it is indicated that it should be so raised. Note that the leather should be kept damp, and as the heat of the hands and the natural evaporation tend to dry it, attention should be given to the point.

(3) Turn the leather face upwards and place it on the glass. Take the tools shown in Fig. 13*c* and 13*d*, and go round the edge of the design, and flatten the leather just immediately outside it, and close up to the design. The result is that the design stands up in strong relief.



Leather Work Designs.

(4) Prepare some paste made from rye flour ; make it thick, and fill the raised spaces with it from the back ; to hold it in, spread pieces of paper over the paste. One piece can, of course, be put over the whole back.

Let the whole dry somewhat, but keep the leather as straight as possible during the process.

(5) The surface work is now done, and much depends on this. The paste has been allowed to dry to some extent, and, although it is stiff, it is yet impressionable to some extent.

This enables us to put veins in, to undulate the surface very delicately, and serrate and otherwise elaborate the edges.

Ground work can be punched in many ways, but the plainer treatment is the best.

Fix the leather round the edge of the cardboard, and proceed in the usual way to put the blotter together.

The making of gloves in various kinds of suitable leather, notably doeskin, affords a very fascinating form of handwork. The patterns for all kinds of gloves can be obtained through trade channels, and the leather likewise. Regarding the patterns, enterprising students will try to produce these themselves.

The Further Road.

Again attention has to be called to the design side of the craft. Use other people's designs and you may get good material results ; but you undergo little development. Begin to make your own, and, although at the first the intrinsic value of the design is small, yet the efforts made are tremendous and progress in development is measured by effort. Draw incessantly, study the best of books, have lessons, and you will find your work improve very much.

In all modelling work, you will find the ability to model in clay or wax of inestimable value, so practise and study clay modelling.

Bibliography.

Leatherwork. C. G. Leland. (Pitman.)
Bookbinding. D. Cockerell. (Pitman.)
Artistic Leather Work. E. E. Carter. (Spons.)

The Cost.

(*a*) *Capital Cost.* The cost of the tools for the second type is the same as for light metal repoussé.

For the first type, the cost of the punch is about 3s. 6d., and that is the only tool, besides scissors, that is needed. One punch between two students is enough ; one pair of scissors each is needed.

(*b*) *Annual Cost.* For six students the cost will run to about £3. But, as most students will buy their own materials, this cost will be much lowered.

CHAPTER XIX.

DESIGN FOR CRAFT WORK.

It will be obvious from the many references to design in connection with the craft work described in this book that it is quite indispensable for each craftsman to possess a sound knowledge of design, both as regards its theory and its practice. The roots of craft work lie in design.

Craft work does not consist merely in the making of an article, and it does not concern itself solely with construction. Construction certainly comes within its survey, but only as a part of a much greater whole. Design surveys the whole field of craft work, and is concerned more largely with planning the work, both constructional and ornamental, in accordance with the principles of proportion, order, simplicity, rectangulation, and harmony.

The extent to which these are used is really decided by "feeling." In making designs, you arrange the masses and lines; the proportion that one bears to the other; the character of the detail of the masses; the kind of element you will use—all of which are decided by "feeling."

It is really knowledge at first hand; that knowledge which is more than intellectual conception, of which the intellectual aspect develops later. The reasons for the planning of a design in a particular way also become apparent later—often very much later.

There are two aspects of design, as, indeed, there are of all crafts, and of any art subject. There is the life or spirit side, and there is the form or matter side.

Both are necessary; but it must be realized that the form side is not the chief side. It is the channel through which the spirit flows and becomes visible. But the more vital part of design is the spirit side, where life abounds and creative qualities have root.

It is quite possible to have a wonderful knowledge of form, and to have nothing to express. You can know the whole of the form aspect of art from one end to the other; you can be aware of the existence of all the elements of design, the principles that underlie their grouping, and the whole history of the evolution of ornament, and you may not be able to make designs that can be considered good. Why? Because there is no "feeling" in the matter; there has been no spirit to express.

In such a case the whole matter resolves itself into a mechanical building up of elements, according to the mechanical application of principles; and the result is a design that is quite mechanical and hard, and that entirely fails to move one.

Therefore, it is well not to stress the form side of the work too

much, and to imagine that all that is necessary is a knowledge of the principles of ornament.

Cultivate the love of beauty and the ability to compose, and to arrange elements in the mind's eye in groupings, the forms of which give pleasure and which really have meaning.

The matter or form side must, of course, be known and explored ; but the spirit or life side is the subject of feeling and cannot easily be put into form.

Elements of Design.

When designs are analysed as regards their parts, it is found that these fall into one or other of the following groups—

(*a*) Dots and lines.
(*b*) Natural foliage and objects.
(*c*) Artificial foliage.
(*d*) Artificial objects.
(*e*) Animals.
(*f*) Human figures.

The dots and lines are used very largely in chip carving, and in very simple forms of painted and other surface ornament.

The nearer one gets to the human figure, the less does one repeat the element.

Dots and lines are in themselves quite devoid of interest and life. The human figure, on the other hand, is typical of life and interest.

Because these things are so, it is not surprising to find that the more you repeat dots and lines, the more you increase the interest, but the more you increase the human figure, the greater is the satiety.

With animal forms are included those partly mythical, partly symbolical forms, known as centaurs, satyrs, fauns, caryatides, griffins, dragons, sphinxes, and phoenixes.

The Field of Ornament.

This is the space in which the elements just now spoken of are arranged, according to the principles of ornament, to form the design.

In considering it, any margin necessary is included, as its width has a bearing upon the whole design.

Sometimes the whole field is split up into sections, as, e.g. the wall of a room which has a frieze and a plinth, and the main filling, as sections ; but all these sections are considered as a whole in planning the design.

The Difference Between Decoration and Ornament.

Decoration may be said to be that which, when it is organized, becomes ornament ; but remaining, as it does, without structure

or organization, is just decoration. Figs. 1 and 2 show this quite clearly.

The use of sprays of flowers on vases or pottery is an example of decoration, as in Fig. 3. The same spray, arranged as in Fig. 4, in accordance with the principle of repetition, becomes organized structurally and is now ornament.

Drawing from Nature is not Ornament.

The idea that drawing from Nature is ornament is a mistake that should not occur often to-day. It has, however, been common in times not so very long ago.

The error arises, in the first place, out of the mistake spoken of in the last paragraph, in which decoration is mistaken for ornament.

In the second place, it must be remembered that, when used for design, the objects in Nature will not appear as they do in a freehand drawing, but will differ in light and shade, and in the arrangement of parts to suit the material used.

It is obvious that if we draw a daffodil from Nature, it could not look just like that drawing of it if we worked it in wool, or linen, or cotton, by weaving or by embroidery; or if we modelled it in clay, or carved it in wood, or beat it out in metal. It must inevitably be changed in appearance according to the material in which it is to be worked.

The Principles of Ornament.

Although the evolving of design is a matter of "feeling," yet the analysis and examination of all designs show that they are arranged in accordance with certain definite rules, laws, or principles.

These principles are not the arbitrary assumptions of any autocrat of art, but automatically arise out of the practice of ornament. Certain results which please are found to show the same type of structure, and thus a framework is revealed which we can look upon as a principle.

If you take a handful of beads and pins, which may approximate to the first class of element, viz., dots and lines, and throw them down on a plate, you would get CHAOS (Fig. 5). Reduce this to ORDER, as in Fig. 6. Even now, although the result is better, much more than this is needed to give a pleasing effect.

It is found that these more satisfying effects can be obtained only by organizing the structure of the designs in certain definite ways, and these ways are in accordance with the principles of ornament already spoken of.

The value of order has already been mentioned.

Proportion and Balance.

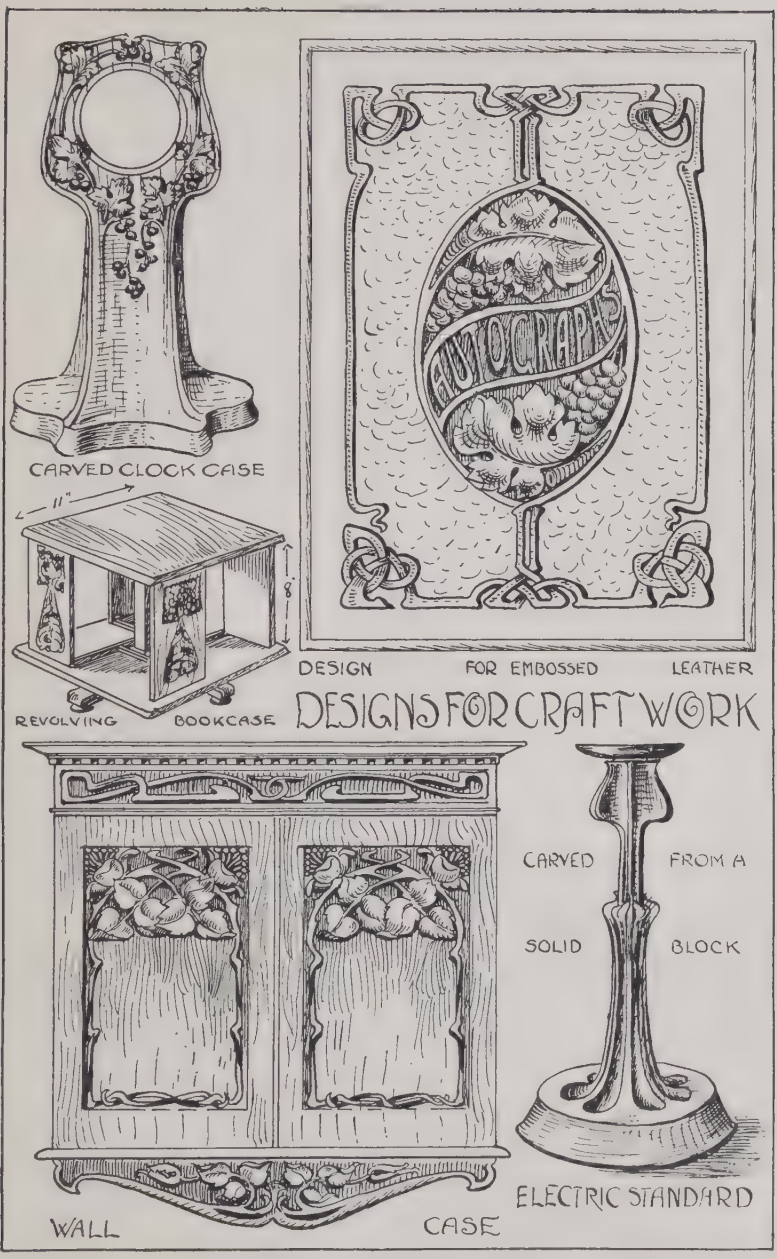
These are two principles that are closely allied. The simplest elements can be formed into things of beauty by giving them a rightly proportionate arrangement. This applies to more than what is usually thought of as ornament or design. For example, the lines of a dressing chest, or an overmantel, need be nothing more than straight lines, and yet the proportion that it is possible to get between them can clothe them with airy lightness and grace and beauty that will give the utmost sense of satisfaction to one's aesthetic taste.

Variety and Contrast.

Many designs appear to be insipid and colourless, and decidedly devoid of interest. This is often because the elements used are too much of one size, or are arranged without regard to contrast. This is remedied by varying the sizes and positions of the elements, and so bringing about a state of contrast.

Rectangulation.

This is, perhaps, the principle which most clearly illustrates the difference between decoration and ornament.



Designs for Craft Work.

It consists of making the design itself follow the shape which it is intended to fill.

In Fig. 7 is shown a shape of rectangular form, which is filled with a design that conforms to the outline, and is, therefore, arranged according to the principle of rectangulation. The design itself is arranged by the side in Fig. 8, without its outline, and it will be seen clearly that its shape corresponds to that of the space for which it was designed.

If this is compared with the design in Fig. 9, which also has been made for the same rectangular space, the value of rectangulation will be apparent.

Harmony.

The value of this principle is almost self-evident.

When we commence almost any work in which we take strong interest, we become subject, and often fall, to the temptations of loudness, over-decoration, the use of much display, extravagance, and other similar failings. Although it is natural, it is not pretty, and a consideration of harmony will help us very much in so making our designs as to be good in themselves, in relation to their surroundings, and all animated by the same spirit.

Simplicity.

This is similar to harmony, and, in fact, is one of the means by which harmony is brought about.

The more simple we make our work in structure and in detail, the less risk do we run of making busy, uneasy, obviously misfitting designs.

Simplicity, with due proportion, gives excellent results.

For children especially this is a principle that needs emphasis. They are much more likely to progress quickly and well if their efforts are directed with a view to simplicity.

The Law of Growth.

This is a law that is often transgressed. If natural forms are chosen as elements, then the parts should be arranged so that they do not show false growth, no matter how the proportions of the parts, or their shapes, have been altered by reason of the form of space available.

Thus, a plant has a beginning, which, even if it is not on the field of the design, should be suggested. Then, the leaves should correspond in their essentials, such as number on the spray, their serrations, and to some extent their shape, with the original.

Flowers and fruit, too, should be placed on stems in accordance with the law of growth.

Leaves do not grow at each end of a stem, an arrangement sometimes seen in designs. Then some plants have their leaves

growing in pairs, and some alternately. Some leaves are serrated, and some not ; flowers having six petals should not be given five ; stems like those of the tulip, that are straight, should not be drawn " curly " ; and similar contraventions of the law of growth should be avoided.

The Design should observe the Limits of the Boundary.

Take a large piece of paper and cut out of it a square of 1 ft. side. Take it to a hedgerow, place it on the hedge, and note just how the twigs, branches, and leaves and flowers are arranged with reference to the boundary lines. It will look, possibly, as shown in Fig. 10.

On every side, the branches either stretch out beyond the boundary, or they enter the field from outside. Leaves are cut across, and flowers also. The references on all sides to the points of origin, or the destination of the parts of the design, the awkwardness and angularity of the cut leaves and flowers, and the unequal massing and spacing of the parts, give an uneasy lack of repose that is quite uncomfortable.

This can be remedied by taking the same elements and rearranging them upon an organized plan, as in Fig. 11. Upon this plan the parts are arranged according to the law of growth, but with all these parts within the boundaries ; and the unequal massing is avoided by rearrangement.

Conventionalization.

It will be found very early in the application of design to craft that natural form cannot be worked in material in the same shape and form in which it occurs in its natural state.

There are several reasons for this. First, there is the limitation imposed by the material.

It is obvious that such things as the grain of wood, the warp and weft in weaving, the texture of clay, and the comparative stiffness of metal impose limitations not easily overcome, and which must influence the design.

The second cause is the shape which forms the field of ornament. This has already been touched upon.

The third cause is due to artistic feeling. You feel that " masses " should exist in certain places, and you put the masses there. These masses are broken up in detail, but the details are close enough together to appear always as masses.

There is another cause that also operates in the conventionalizing of the elements of design, and especially does this operate as regards the treatment of the surfaces. This cause is the character of the tools that are used. Each material has its own appropriate tools ; no other would serve to work the material.

Even within the choice of tools for one material alone, various different effects will follow the use of different tools. In wood

carving, for example, if you limit your work to, say, six tools of specific shape, you can get the same design to look quite different from that result produced by using six entirely different tools. The tools used exert a really important effect upon design.

As to the extent to which the conventionalizing should be carried, there naturally exists a wide variety of opinions.

Looking backwards through history, we can see that in every age and country, natural form has been changed very considerably by reason of the causes mentioned; and changed, often enough, almost out of all recognition.

There are many other principles which operate in the building up of the structure of ornament, and the necessity for which will become apparent as time goes on. But enough has been said to

FIG 12 MASSES ARRANGED 13 MASSES SPLIT UP 14 COMPLETED DESIGN

guide the beginner, and reference must be made to books, or schools, or teachers, for further guidance relative to the practice of ornament.

How Designs may be Built Up.

It will be found that the best way to begin to build up designs is to arrange, first, either—

(*a*) The masses of the design; or
(*b*) The lines of the design.

Fig. 12 shows a rectangle with the masses limned in.

Fig. 15 shows a rectangle with the lines arranged.

The arrangement of these masses and lines is a matter of "feeling"; at the same time the use of the principles that have been mentioned govern the success attending their planning.

The masses in Fig. 12 may be split up into details of any kind

that may be thought desirable ; and the lines in Fig. 15 may be clothed with any details that appear to fit the purpose for which the design is intended.

Fig. 14 shows one suggested manner of evolving the design which has mass as its basis ; and the third sketch below similarly illustrates the design whose skeleton is the line formation of the first sketch in Fig. 15.

Geometrical Form.

The spacing of the field of ornament by the aid of geometric division is a great aid to the beginner. It has been used in historic ornament to a large extent.

There are two ways in which it can be used. One is by dividing the field of ornament permanently into definite sections that have

FIG 15. THREE STAGES IN DESIGN BASED ON LINE CONSTRUCTION

a geometric plan, as in Fig. 18 ; and the other is by dividing the field into temporary geometric divisions, the lines of which are rubbed out, but whose influence is detected by an analysis of the planning of the design. Fig. 19 is an example of this.

The Starting Point in Design.

Very often, designs that are good in themselves are applied incorrectly, and in their wrong application must be classed as bad.

The ultimate position of the design has an important bearing upon its structure. A design suitable for a vertical panel will not do for a tile which is to be horizontal.

This affects the starting point, which is so often a source of trouble. The starting point can be in the centre, or in any corner, or in any side.

Figs. 18 and 19 show a square field with the starting point in the centre, and this will do for either a horizontal or vertical position. Figs. 12, 13, and 14 show a similar panel in which the design commences at the centre of a side. This will do only for a vertical position. Fig. 15 gives a design whose starting point is in the corner.

Ancient or Modern?

Shall we draw our inspirations from historic periods, or shall we work entirely upon our own conceptions, and in our own way? It is a question that can be answered in more ways than one.

Perhaps a good answer would be to say that the ornament of past periods should be studied well and thoroughly; but that we should make our own choice of elements, and proceed to build them up without any reference to the details of past styles, but only so far as the study of these styles helps us in the application of the general principles of ornament.

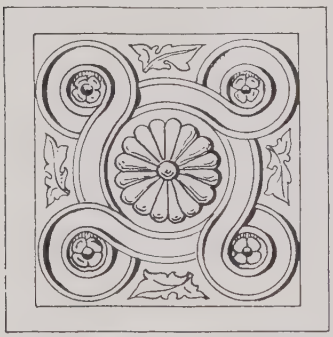


FIG 18 PERMANENT GEOMETRIC DIVISION

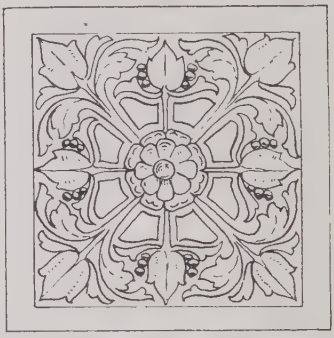


FIG 19 INVISIBLE GEOMETRIC DIVISION

It is in accordance with educational principles to study natural form and draw it; then to work it up into design, and afterwards to work the design.

We can let historic ornament influence our design, but we should carefully avoid direct copying in the making of our own designs.

The Further Road.

Nothing will repay the craftsman so well, in either quantity or quality, as time spent in the mastery of design; and the thrills that come from the growing power to produce good design are not exceeded by those proceeding from any other achievement.

The study of design for all kinds of purposes is a great means of development, and, educationally, is of the greatest possible value.

As a means of culture, its study is worth the time spent on it. It links up with history on the side of its historic development; and with geography in so far as we consider the various manifestations of craft work in different countries, and why this craft work took the forms in which we see it.

Craft work has a close connection with the development of peoples; and the design involved in the production of craft is the

outcome of the spirit of man striving for expression against many adverse forces and in many strange conditions.

Attend schools of art ; always have some work in design on the way ; learn to look upon all ornament you see with a critical eye ; and a truly critical eye is one that can appreciate, as well as depreciate—always remember that. You can learn, in time, to appreciate the difference between the good and bad ; and between the various shades of good and of bad ; and you will learn to detect the influence of any style of ornament in the work you see done ; and you will learn to fix the age of the design, too, in many cases.

Use pencil, pen, and brush in evolving designs.

The brush, with neutral colours, is good in deciding masses, and in arranging the direction of the principal lines.

Study the materials you will have to use. Wood, linen, metal, ivory, and leather have varying characteristics and properties, and each one of these variations means so much in the preparation of the design.

Bibliography.

There are so many books on design available that it is a really difficult matter to decide which to suggest. Doubtless, each student will have access to a library which contains some books, and much can be learnt from almost any book on design.

The few suggested here are very useful, but it must not be thought that they are exclusive. Wide reading must be accepted as a very necessary condition of progress.

Drawing and Design. S. Clegg. (Pitman.)
Drawing and Designing. C. G. Leland. (Pitman.)
Historic Ornament. R. Glazier. (Batsford.)
The Bases of Design. W. Crane. (Bell.)
The Styles of Ornament. Speltz and Spiers. (Batsford.)
Pattern Design. Lewis Day. (Batsford.)
Ornament and Its Application. Lewis Day. (Batsford.)
Lessons on Colour. H. A. Rankin. (Pitman.)
Writing and Illuminating and Lettering. E. Johnston. (Pitman.)
Design for Wood Carvers. H. Turner. (P. Marshall.)
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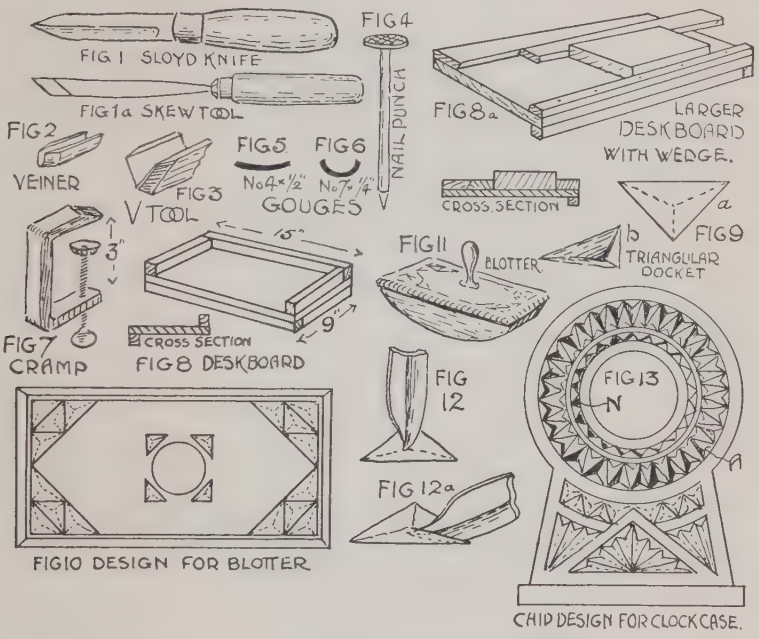
linseed oil, when the grain is brought out well, and the resultant colour is good.

Description of Particular Examples.

The actual working of three designs is now described, illustrating one example of each kind of chip carving.



Chip Carving Details.

Design I. Fig. 10 shows a design for a hand blotter (Fig. 11) that can be worked entirely with a knife. The stages in the work are as follows—

(1) Prepare the design, correct it, and adjust it. Then draw it on the wood.

(2) Take the knife and insert the point in the centre of each triangular pocket (Fig. 12); press it into the depth you wish to cut, say, $\frac{1}{8}$ in. Then take the knife over in the direction of the angle, to the position shown in Fig. 12*a*, and now a sloping cut will be the result, increasing regularly from zero at the angle to $\frac{1}{8}$ in. at the centre. This is done to each angle, and then we are ready for the next stage.

(3) With the knife, commence cutting away the wood that lies

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With a foreword by Canon H. D. RAWNSLEY.

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allow the cloth to be turned in on itself. Both children and adults are sorely tempted here to cut the cloth in order to turn it over the head of the book. By cutting at the head all chances of a good finish are absolutely lost. Instead of cutting the cloth, the muslin is cut as shown in Fig. 17. Paste the cloth back piece and corner pieces; fix the latter, first rubbing them well down on the face,

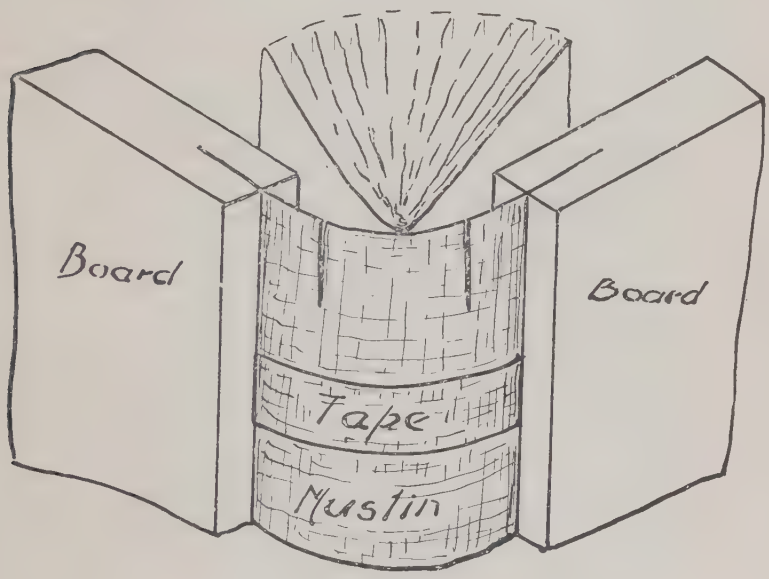

FIG. 17.

leaving such a margin as will ensure a good close mitre[1] on the inside when the cloth is turned over the edge and on to the inner face of the board. The four corners done, the back cloth may be put on and rubbed well down on to the back. Now stand the book on its end, draw the cloth away from the top of the board, double the projecting part back on itself, at the same time putting it through the slits in the muslin, over the edges of the boards, and on to the inside. Repeat at the other end, and then leave to set.

The space between the corners and the back cover can now be covered with paper to match the colour of the cloth, laid well down on to the boards, the edges being turned over, and having a margin inside of about ½ in. The shape of the "filling in" pieces of paper can most easily be found by placing the sheet from which the piece

[1] A mitre is a joint in which the edges of the cloth meet at an angle of 45°.

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A Suggestive Course for Teachers of Modelling and for Students.

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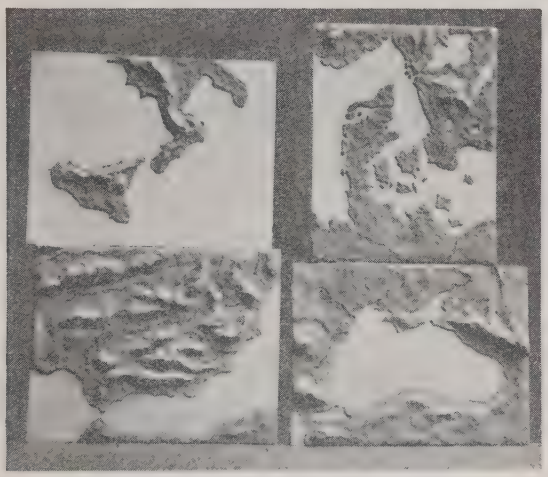
To put your pupils to the test, set, during the last quarter of an hour of the modelling lesson, a problem such as this—Model any two or three things you have seen in a chemist's shop window. Very probably, some children will waste a lot of time trying to recall what might be seen in the window at such and such a shop; or others, having set to, and modelled their choices, find that after all the proportions and general features are not so convincing, that



GEOGRAPHICAL MODELLING.

one instinctively recognizes them for what they are meant to represent.

In any case, the obvious corollary must be to insist upon every pupil having more frequent recourse to pencil and note-book, and so taking pains to acquire accurate impressions of these everyday things. The habit, thus gained, of looking more carefully about us, is of the highest possible value; besides, we all recognize the prime importance of expression as an aid to clear thought. The facts we read and the impressions we receive through sight are never properly our own until we have reproduced them, and one of the best means of reproduction—and perhaps the most searching in its investigation, too, for words are apt to deceive both ourselves and our audience—is that by which we express ideas with the aid of the muscular sense and in concrete form. Test for yourself any fact with which you fancy yourself intimately acquainted.

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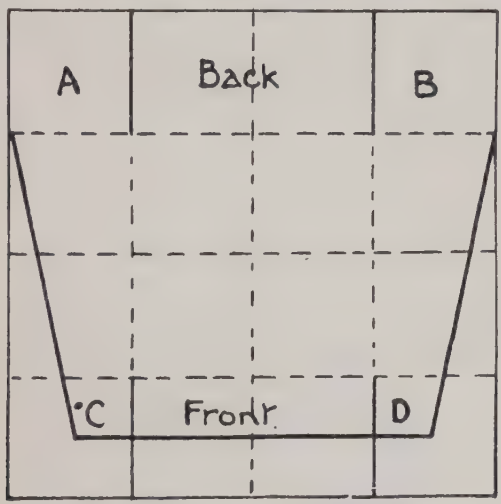
MODEL LXXVI.

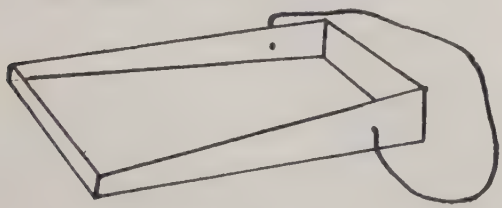
NEWSBOY'S TRAY or HEARTH TIDY.

This is a modification of the Square Box. Paste A and B round the back and C and D on to the front. Attach strap. If the broader end A B be ornamented with two knobs it will serve for a hearth tidy.

The model will also serve for a baker's tray.

Exercise. Paste a piece of paper over top. Turn over to serve for a desk slope. Make a table on which to fix it.





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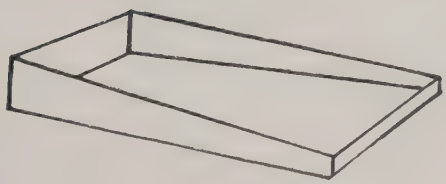

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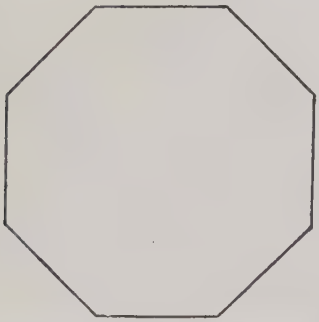
CHAPTER VII.

THE OCTAGON AND EXTENSIONS.



THE draught-board (Plate VI) is made by pasting or gumming pieces of coloured paper upon an octagonal base.

Coloured paper is introduced in this model in order to show how it may be used for decorative purposes.

To make the draught-board, cut out strips of coloured paper and paste them upon a piece of white paper, so that dark and white alternate (as in Fig. 27).

Next cut along the lines shown in Fig. 28, thus obtaining strips of alternate light and dark squares (as in Fig. 29). These strips may be glued upon the octagonal base.

Coloured paper may now be pasted upon the borders to decorate the model.

Fig. 27.

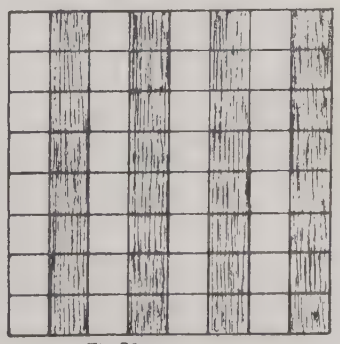


Fig. 28.

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To indicate the adaptability of the material, full-sized plates are inserted showing work done by infants, mentally defective children, girls from ten to twelve years of age, and also by adult students at the Manchester Central School. All expensive cardboard shapes and cane frames are eliminated, thus reducing expenditure, and bringing within the reach of all schools an interesting and instructive form of educational handwork.

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10. How does the N. and S. line lie with reference to this line ?

If a chord of a circle be drawn through the two points where the end of the shadow of a vertical stick falls on the circumference of the circle, then the line joining the middle point of the chord with the foot of the stick is a N. and S. line.

Exercise 34.

A Line and an Angle Necessary to Fix Direction.

1. Place a stick along the N. and S. line, and make it turn about its S. end in the same direction as the hands of a watch. On making a quarter of a revolution the stick points east; on making three-quarters of a revolution, the stick points west.

2. Turn the stick till it lies half-way between N. and E., E. and S., S. and W., and W. and N.

It then points NE., SE., SW., and NW. respectively.

3. Could you have fixed these directions without the N. and S. line ? without knowing the necessary amount of rotation ?

4. Draw a circle and show by means of radii the relative directions mentioned above. With which line will you commence ? What instrument will you require ?

A fixed line and an angle are required to determine direction from a given point.

Exercise 35.

A Scout's Clock.

1. Cut a circle of diameter 6″ out of cardboard and graduate it for every five degrees, as in Fig. 22.

Fig. 22.

2. Cut out of thick cardboard or tin a pointer $2\frac{1}{2}$″ long. This in your model is to represent the direction of the sun.

3. Take the screw out of the clock dial you made in Ex. 32; and fasten together in order, first the graduated circle, then the $2\frac{1}{2}$″ pointer, then the dial, and then, last, the hour hand.

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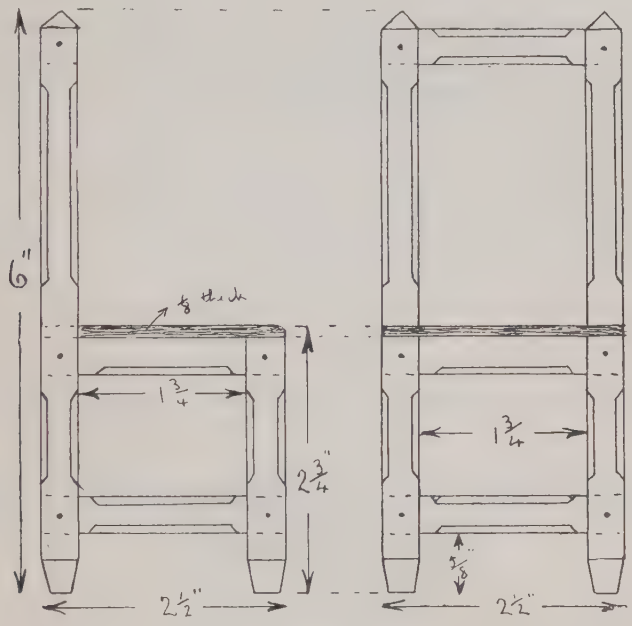
MODEL 7.

SMALL CHAIR. (Plate 3.)

This pleasing little model is made throughout of wood three-eighths of an inch square. The material required consists of two pieces six inches long, two pieces two and five-eighths inches long, and eight pieces one and three quarter inches long.

All these pieces should be cut off perfectly square at the ends, so that a great deal of trouble may be saved later.



Model 7.

SMALL CHAIR.

The two six inch, and two and five-eighths of an inch pieces, should be bevelled with the knife at each corner as in the drawing. The back and front parts of the chair are now nailed together, the ends of the one and three-quarter inch pieces being first smeared with glue. The remaining one and three quarter inch pieces are now glued and nailed in position; any slight roughness may be removed with a little sandpaper. The seat may be cut out, in cardboard or in pine veneer, to fit exactly on the framework of the chair, and then glued to it. Colour with water colours if it is thought desirable.

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CHAPTER II.

PREPARATION OF MATERIAL.

Raffia is prepared for use in various ways, according to the class of work for which it is intended.

When taking strands from the hank, it is advisable to have the latter suspended from a nail or hook. Each strand should then be drawn out singly, care being taken to tighten up the binding occasionally as it becomes slack. If accommodation permits, it is better to leave the unused strands hanging, as constant twisting and untwisting of the hank renders them liable to fray and split.

For winding exercises, only the best strands should be used. They are generally prepared by being soaked in water for a minute

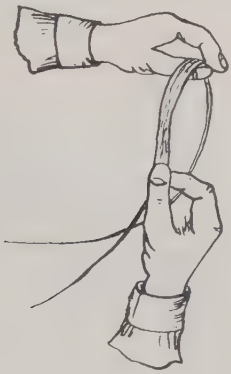

Fig 1.

or two, and afterwards straightened out by drawing each strand between the finger and thumb (Fig. 1), working from the broad centre towards the ends.

Another method often adopted is to damp the raffia with a cloth or sponge, always wiping from the hard end of the strand, or, if this has disappeared, from the centre towards the ends. If attention is not paid to this, the fibres on the edges are apt to tear off in long, thin strips, thus causing an unnecessary waste of material.

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On mounting, to point the moral, arrange the fruit just out of reach of the fox.

4. The Fox and the Crow.

The crow should be perched on the branch of a tree. The fox would be cut in the same position as for the preceding picture. Suitable backgrounds might be cut according to taste.

Omit the vine leaves and put the crow on the branch instead. (*See* PLATE XLV.)

The Crow and the Pitcher.

The crow might be cut out in sections, the wings, tail, legs, head, body, and the stone in the beak, being first separate ; but it is more effective if done as a whole. If the crow in flight be thought too difficult, one perched as in the preceding picture might be used, substituting a stone for the cheese in her mouth. (*See* PLATE XLVI.)

PLATE XLVI.

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the use of both thumbs, or two fingers simultaneously, can be given.

Arithmetic—addition and subtraction—can be allied to this. Encourage children to make further developments of their own.

3. THE BALL.—*Continued.*

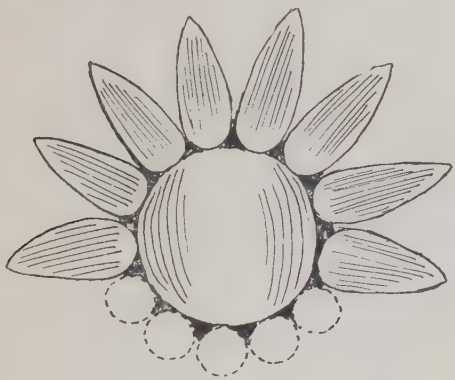

FIG. 7

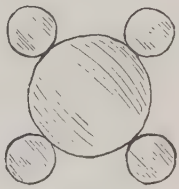

FIG. 8.

Several balls of various sizes are made. Examples in the four rules of arithmetic are connected.

Children work out pattern or design by arranging balls and using pressure.

Children's attention is drawn to wall-paper—repetition.

4. A RING.

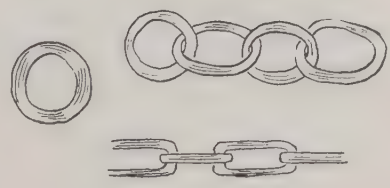

FIG. 9

A piece of clay or plasticine is rolled on the board into a thin roll. This is joined up to form a ring.

The terms circle and circumference introduced. *Cf.* Ball.

Join up a number of rings to form chains. Note kinds of chains in use and why. Refer to welding.

Arithmetic processes allied to the work.

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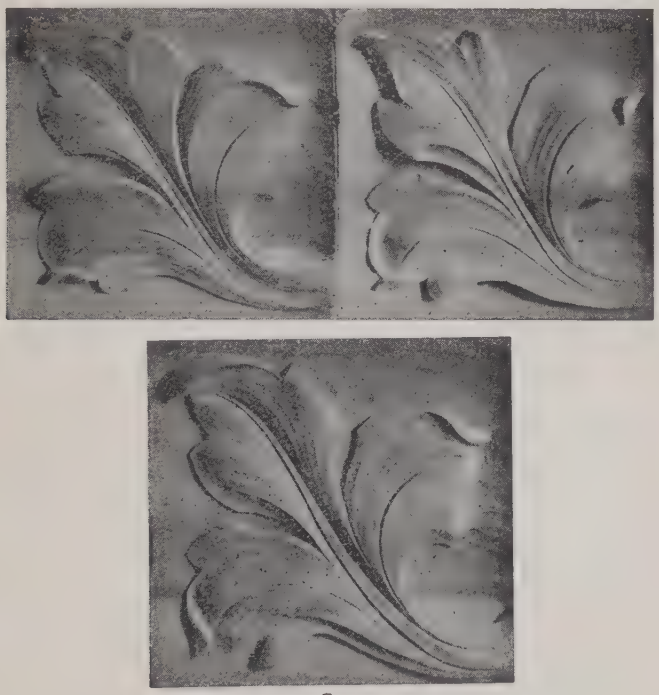
especially in figure statuary. We know that for a man to be ideally proportionate, the rule is that he should be eight "heads" in height, that is, if his feet be extended; and the body has other definite proportions. In art generally, the height and width bear a relationship so fixed that they produce "balance." The masses of ornament must be similarly proportionate with each other, and with the spaces between the ornament, or, as it is called, "the ground." These must be balanced so that they will produce a harmonious



PRINCIPLES OF MODELLING.
PLATE I.

spacing of the whole. It is not necessary to distribute the ornament evenly over the ground, but the balance of the ground space with the ornament must have a definite symmetry.

ORDER. It is essential that there be some arrangement or definite plan in view. As the bricksetter commences to build the foundations first, then the walls, and lastly the chimney stacks, so must the designer commence with his elements conceived in proper order. For instance, if the design is to be floral, he must

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